GREAT LAKES FOREST RESEARCH CENTRE
CENTRE DE RECHERCHE FORESTIÈRE DES GRANDS LACS

Forest Insect and Disease Conditions in Ontario, 1983

G. M. Howse and M. J. Applejohn

Miscellaneous Report No. 16

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THE GREAT LAKES FOREST RESEARCH CENTRE

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FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO, 1983

G.M. HOWSE and M.J. APPLEJOHN

GREAT LAKES FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
GOVERNMENT OF CANADA
1984

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ABSTRACT

This report reviews the status of major forest insects and diseases in Ontario in 1983 and for some pests provides a forecast of conditions for 1984. Seven major forest insects (three coniferous and four deciduous), three tree diseases (coniferous) and two abiotic conditions are discussed in detail; many other noteworthy insects and diseases are listed in tabular form. Special surveys and insect control programs conducted in 1983 are described. More detailed information is available on request from the Great Lakes Forest Research Centre.

RÉSUMÉ

Ce rapport fait le point sur les insectes et les maladies majeurs des arbres en Ontario en 1983 et présente, pour certains ravageurs, une prévision des conditions pour 1984. Sept insectes importants (trois ravageurs des conifères et quatre des feuillus), trois maladies (des conifères) et deux conditions abiotiques font l'objet d'une analyse détaillée; beaucoup d'autres insectes sont décrits sous forme de tableau. Des programmes spéciaux de répression réalisés en 1983 sont examinés. Des données plus détaillées peuvent être obtenues au Centre de recherches forestières des Grands Lacs.

ACKNOWLEDGMENTS

The authors of this report wish to acknowledge the contribution of all members of the Forest Insect and Disease Survey Unit at the Great Lakes Forest Research Centre and the support and cooperation of the Ontario Ministry of Natural Resources.

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INTRODUCTION

The primary objective of the Forest Insect and Disease Survey Unit (FIDS) at the Great Lakes Forest Research Centre is to provide accurate and timely information on the kind, severity, extent and impact of forest insect and disease problems in Ontario. This objective is accomplished through a process of field and laboratory activities that involves detection, identification, evaluation and prediction of forest pest conditions in the province. Basically, the information collected is used to develop and adjust federal forest protection research programs and to assist in the improvement of provincial forest management and protection practices. In addition, the FIDS Unit has a number of other closely related responsibilities including assistance to the province on pest control operations, public pest extension services, assistance in plant quarantine activities and the conduct of special surveys as necessary. The Unit also does research in sampling methodology, damage appraisal and other areas to improve its own efficiency and to assist in a national effort to develop better pest surveys.

The support and cooperation of the Ontario Ministry of Natural Resources (OMNR) at all levels, districts, regions and headquarters are particularly noteworthy. The provision of several hundred hours of flying time and other forms of aid enable the FIDS Unit to do a better job than would otherwise be possible.

This report is a summary of the records and reports submitted by survey technicians who were assigned as follows to OMNR forest regions in the 1983 field season.

R.J. Sajan and D.C. Constable	Northwestern
W.D. Biggs and V. Jansons	North Central
L.S. MacLeod, C.G. Jones and A.J. Keizer	Northern
M.J. Thomson and E.J. Czerwinski	Northeastern
H.J. Weir (retired 6 October 1983) and H. Brodersen	Algonquin
W.A. Ingram	Eastern
H.J. Evans and C.A. Barnes	Central and Southwestern

Health problems were experienced by H.J. Weir in the summer of 1983. As a consequence, his field activities were severely curtailed and eventually he retired in October, 1983. H.D. Lawrence replaced Mr. Weir for about 8 weeks, from late May to mid-July.

Other staff of the Forest Insect and Disease Survey Unit for the 1983-1984 fiscal year were as follows:

M.J. Applejohn, Chief of Survey Field Technicians

L. Cree, Curator, Insect Collection and Herbarium

E.B. Dorworth, Mycology, Culture Technician

H.L. Gross, Pathologist

G.M. Howse, Entomologist and Unit Head

H.D. Lawrence, Insect Control Technician

R.K. McCron, Damage Appraisal Technician

J.H. Meating, Insect Control Officer

Z.M. Moynan, Secretary

D.T. Myren, Mycologist

K.L. Nystrom, Insect Identification Officer

D.B. Roden, Insect Damage Appraisal Officer

P.D. Syme, Entomologist

MAJOR FOREST INSECTS

Coniferous

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

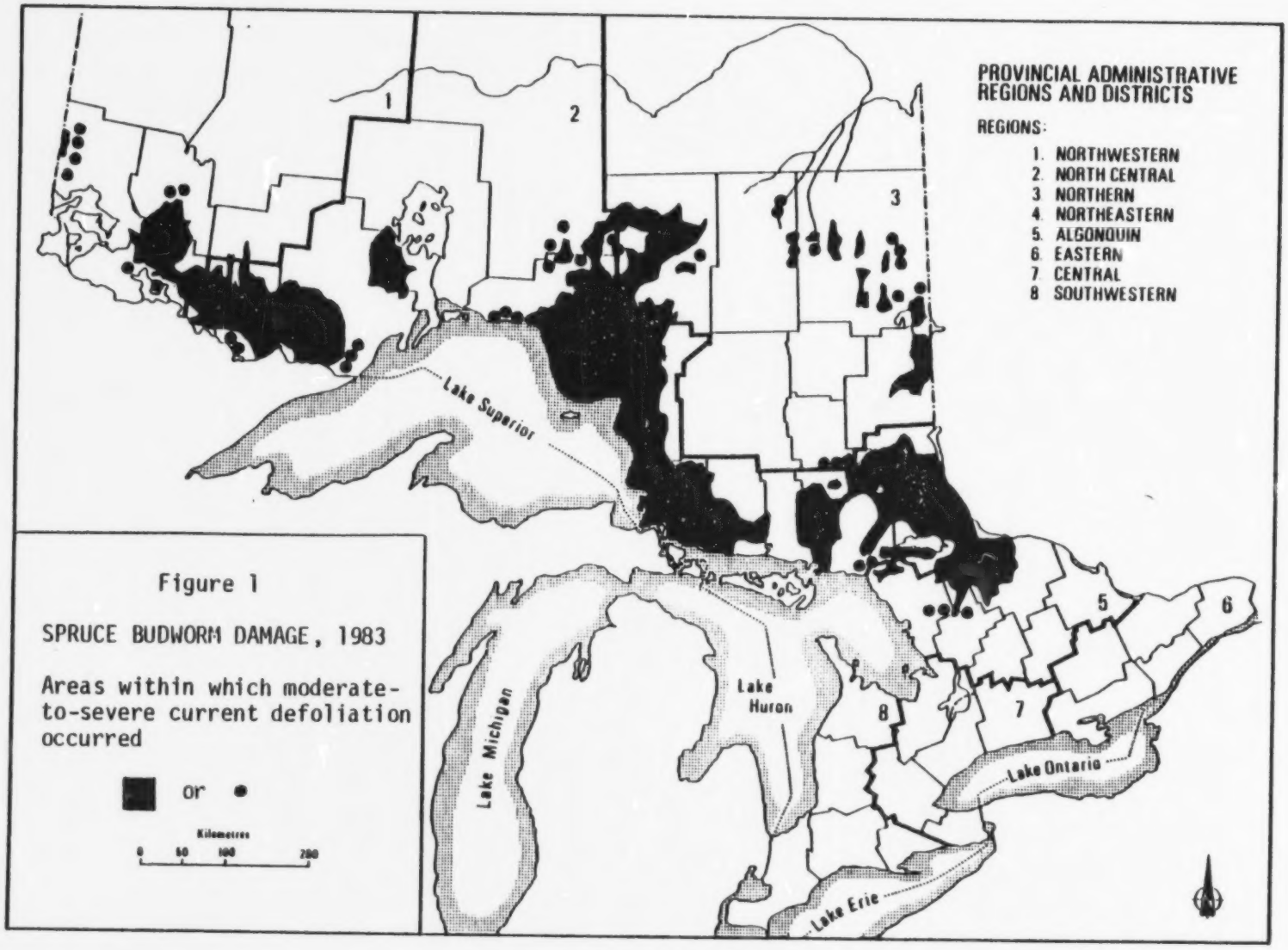
In 1983, the overall area that sustained moderate-to-severe budworm defoliation increased by over a million ha to 9,039,862 ha (Fig. 1), reversing a downward trend which began in 1981 (Table 1). Budworm-associated tree mortality also rose in 1983 and now encompasses an area of approximately 12,119,710 ha (Fig. 2), an increase of some 485,710 ha (Table 2).

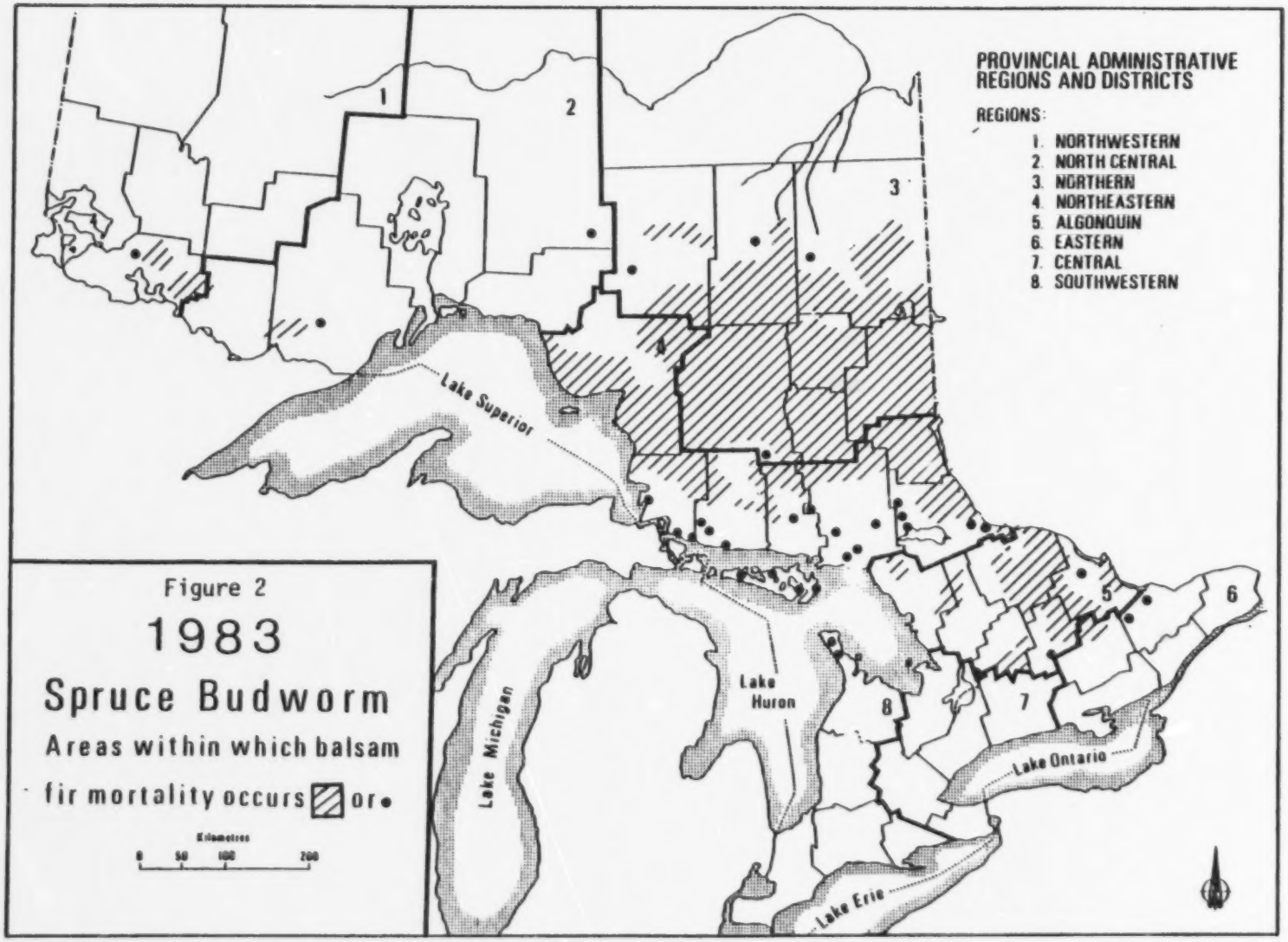
Table 1. Area of forest defoliated by spruce budworm in Ontario between 1981 and 1983.

Outbreak region	Gross area of moderate-to-severe defoliation (000,000 ha)			
	1981	1982	1983	Change in 1983
Northwestern	.658	.931	2.181	+ 1.250
Northeastern	16.958	6.669	6.451	- 0.218
Southern	.601	.423	0.408	- 0.015
Total	18.217	8.023	9.040	+ 1.017

Table 2. Comparison of the area of budworm-associated tree mortality in Ontario in 1982 and 1983.

Outbreak region	Gross area of budworm-associated mortality (000,000 ha)		
	1982	1983	Change
Northwestern	0.150	0.191	+ 0.041
Northeastern	9.934	10.355	+ 0.421
Southern	1.550	1.573	+ 0.023
Total	11.634	12.119	+ 0.485


PROVINCIAL ADMINISTRATIVE REGIONS AND DISTRICTS
REGIONS:
1. NORTHWESTERN
2. NORTH CENTRAL
3. NORTHERN
4. NORTHEASTERN
5. ALGONQUIN
6. EASTERN
7. CENTRAL
8. SOUTHWESTERN
Lake Superior
Lake Michigan
Lake Huron
Lake Ontario
Lake Erie
Figure 1
SPRUCE BUDWORM DAMAGE, 1983
Areas within which moderate-to-severe current defoliation occurred
or
Kilometres
0 50 100 200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5. ALGONQUIN
6. EASTERN
7. CENTRAL
8. SOUTHWESTERN
Lake Superior
Lake Michigan
Lake Huron
Lake Ontario
Lake Erie
Figure 2
1983
Spruce Budworm
Areas within which balsam fir mortality occurs or
Kilometres
0 50 100 200

The figures presented in Table 2 and elsewhere in this report represent gross areas within which stands of the major host species -- balsam fir (*Abies balsamea* [L.] Mill.), white spruce (*Picea glauca* [Moench] Voss), and black spruce (*Picea mariana* [Mill.] B.S.P.) -- showed evidence of moderate-to-severe defoliation or mortality in the course of aerial surveys. These are performed in early or mid-July when the characteristic discoloration of budworm-damaged foliage is at its peak. Flying time is provided by OMNR. Ground checks are carried out before and after the surveys to substantiate aerial findings.

The spruce budworm outbreak in Ontario occurs in three major geographical areas: northwestern Ontario (mainly the Northwestern and North Central regions), northeastern Ontario (the Northeastern and Northern regions) and southern Ontario (primarily the Algonquin Region).

The weather during April, May and early June remained cool and wet following an unusually mild winter. As a result, budworm development, particularly in the more northern areas, was somewhat retarded until about mid-June when the weather changed dramatically. From the second week in June through the remainder of June and July, temperatures were higher than normal and budworm development was very rapid. As a result, the completion of larval feeding and pupation was normal or earlier than normal in most areas.

The bulk of the increase in defoliation in 1983 occurred in northwestern Ontario where infestations more than doubled in size to approximately 2,181,000 ha. The two large infestations, which straddled the Atikokan-Fort Frances and Atikokan-Thunder Bay district boundaries, merged and enlarged to form a single infestation stretching from the Adrian and Marks townships area of Thunder Bay District to the Rowan-Kakagi lakes area of Kenora District and encompassing an area totalling some 1,722,000 ha. A number of small pockets of moderate-to-severe defoliation occurred around the main body of this infestation, affecting a total area of 55,456 ha in the Kenora, Fort Frances, Ignace, Atikokan and Thunder Bay districts. The infestation in the Poshkokagan Lake-Black Sturgeon Lake area of Thunder Bay and Nipigon districts expanded to the east and north to encompass approximately 261,000 ha, an increase in area of about 136,500 ha. Isolated pockets comprising about 200 ha persisted on islands in Moar Lake, Red Lake District.

The outbreak in northeastern Ontario consists of two main sections, eastern and western, along with a number of sizeable pockets in the northern part of the area. The western section stretches from the western Espanola District through the Blind River, Sault Ste. Marie and Hearst districts to the eastern Terrace Bay and southeastern Geraldton districts, affecting a total area of 3,987,905 ha. Within this section substantial increases in the area of moderate-to-severe defoliation were recorded in the Sault Ste. Marie, Hearst and Wawa districts and somewhat smaller increases were noted around the western periphery of the infestation in the Terrace Bay and Geraldton districts.

These increases were more than offset by declines which occurred in the eastern section of the outbreak. This section extends from the eastern Espanola District through the Sudbury, Temagami and North Bay districts to the Quebec border, totalling approximately 1,754,259 ha of moderate-to-severe defoliation. Substantial declines occurred in the Sudbury, North Bay and Espanola districts while moderate increases occurred in Temagami and Kirkland Lake districts. In addition, a number of other medium-to-large patches of moderate-to-severe defoliation totalling 616,176 ha were recorded in the Kapuskasing, Cochrane, Kirkland Lake, Gogama, Sudbury and North Bay districts. The Timmins and Chapleau districts remained virtually free of infestation but low populations were present in a number of areas. Over all, the area of moderate-to-severe defoliation in northeastern Ontario declined by approximately 218,000 ha.

Despite a small decrease (15,000 ha) in the total area of moderate-to-severe defoliation in southern Ontario, sizeable areas remained infested in the Algonquin Park, Parry Sound and Bracebridge districts. Small pockets of infestation which occurred in the southern Minden, Owen Sound and southern Bracebridge districts in 1982 subsided this year. The total area of moderate-to-severe defoliation in southern Ontario was 407,494 ha.

As stated above, budworm-associated tree mortality increased in all three geographical areas of the province and now stands at 12,119,710 ha, a total increase of 485,710 ha or 4.2%. The largest increase (420,982 ha) occurred in northeastern Ontario where there are now 10,354,982 ha of tree mortality. In northwestern Ontario, budworm-associated mortality increased by 41,417 ha to 191,417 ha. The smallest increase, 23,311 ha, occurred in southern Ontario where the total now stands at 1,573,311 ha.

Estimates of the impact of spruce budworm, in the form of depletion of primary growing stock of the three host species (white spruce, black spruce and balsam fir), are summarized in Table 3.

Table 3. Depletion of primary growing stock by spruce budworm in Ontario (000,000 m^3).

	Growth loss 1983	Tree mortality in 1983	Volume loss in 1983	Cumulative mortality to 1983
Balsam fir	1.288	7.966	9.254	69.062
White spruce	.185	1.743	1.928	11.556
Black spruce	.340	1.727	2.067	9.553
Total	1.813	11.436	13.249	90.171

As predicted in the 1982 report, growth loss and tree mortality for balsam fir and, to a lesser extent white spruce, have diminished in northeastern and southern Ontario where continued decreases in the budworm populations have meant reduced stress on host stands. In contrast, growth loss and tree mortality increased in northwestern Ontario where infestations have been building steadily for several years.

Egg surveys were carried out and defoliation estimates were made at 595 locations across Ontario in August and September. The results of these surveys and estimates show an overall increase in egg densities of 61% between 1982 and 1983. In northwestern Ontario, densities increased by 75% over all, with increases occurring in all districts. Consequently, infestations are expected to intensify, and the area of moderate-to-severe defoliation will increase substantially in 1984 in this part of the outbreak. In northeastern Ontario, results were much less uniform, with egg densities increasing in six districts and decreasing in eight districts. Over all, an increase of 23% was recorded. It is expected that areas of moderate-to-severe defoliation will increase in the western portions of the outbreak (Wawa and Hearst districts) and in the northeastern part of the outbreak (Temagami and Kirkland Lake districts). Populations, and consequently defoliation, will probably decrease in the Sault Ste. Marie, Blind River, Espanola, Sudbury and North Bay districts. Increased populations, based on a 35% increase in egg densities, are expected in the Chapleau District, which has been free of moderate-to-severe defoliation for the past two years. In southern Ontario, overall egg densities declined by 17% and this should be reflected in a continued decline in the total area of moderate-to-severe defoliation. However, numerous areas of moderate-to-severe defoliation will probably persist in the Parry Sound, Bracebridge and Algonquin Park districts in the Algonquin Region.

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Populations of the jack pine budworm reached outbreak proportions in 1983 following initial increases in 1982. A total area of 67,142 ha of jack pine (*Pinus banksiana* Lamb.) was moderately to severely defoliated in the Algonquin, Northeastern and North Central regions (Fig. 3 and 4) in comparison with about 1,000 ha in 1982.

In the Algonquin Region, approximately 30,200 ha (503 ha in 1982) of moderate-to-severe defoliation were mapped along the west side of Georgian Bay between Snug Harbour and Key River. The infestation occurred in a long narrow band between Highway 69 and the Georgian Bay coast and included parts of Carling, Shawanaga, Harrison, Wallbridge and Henvey townships in the Parry Sound District as well as a large part of Indian Reserve No. 2 along Henvey Inlet. A small infestation occurred on Franklin Island in Georgian Bay. Egg surveys which were carried out during August, 1983 indicate that infestations will persist and perhaps expand in this area in 1984.

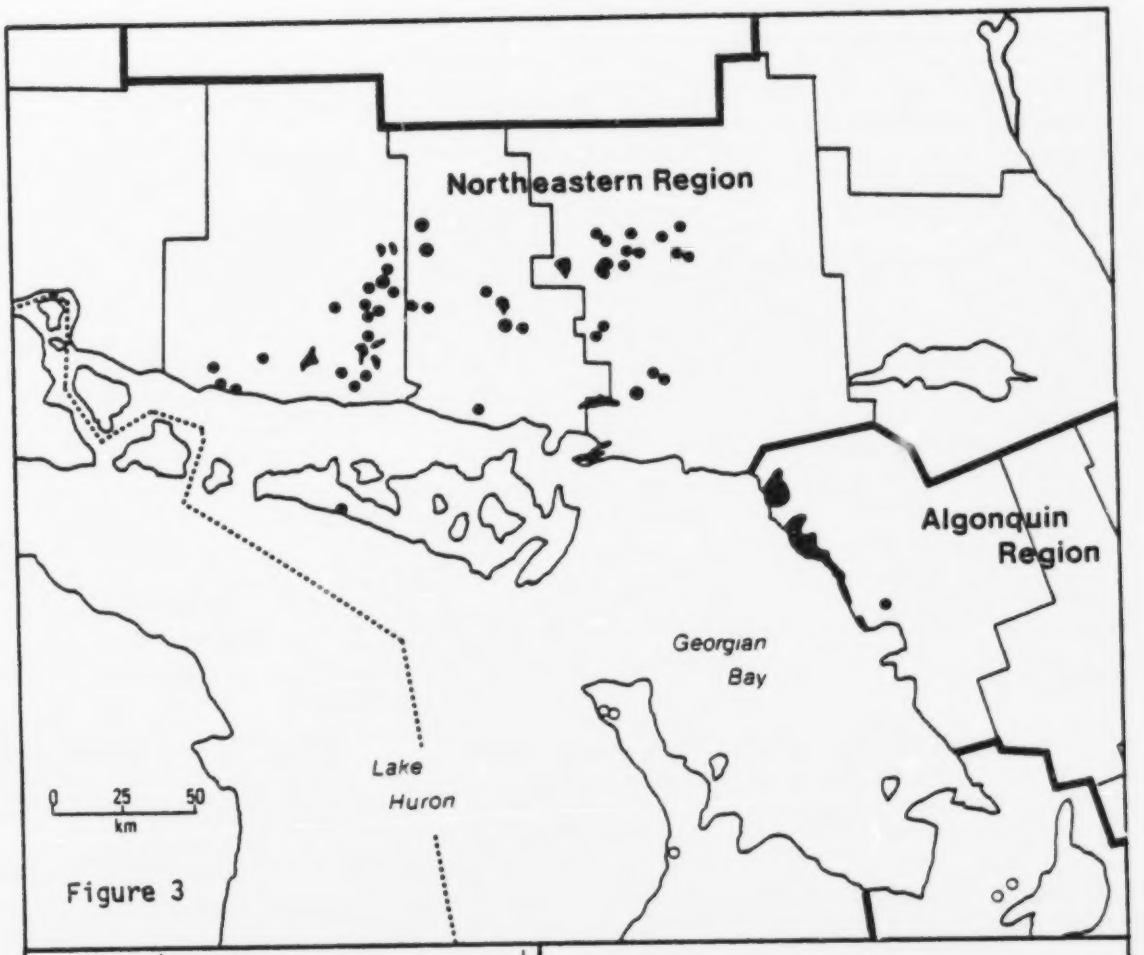


Figure 3

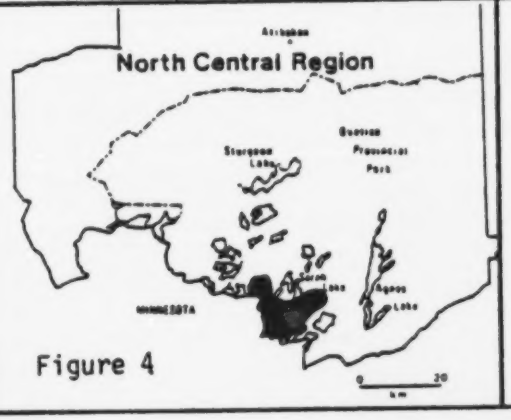


Figure 4

JACK PINE BUDWORM 1983

Areas within which defoliation of jack pine occurred

Moderate-to-severe defoliation .... ●
Light defoliation ..... ○

In the Northeastern Region, numerous small pockets of moderate-to-severe defoliation, totalling 29,970 ha, were mapped as follows: Sudbury District 11,840 ha, Espanola District 8,880 ha, and Blind River District 9,250 ha. In addition, a small pocket of heavy infestation occurred at Misery Bay on Manitoulin Island and a small infestation resulting in moderate damage was recorded at Hiawatha Park in the Sault Ste. Marie District. The number of egg counts in this area was somewhat restricted because of the inaccessibility of many infestations, but in those which were sampled it appears that the infestations will likely persist at comparable levels in 1984.

In the North Central Region, aerial surveys revealed a single large pocket of moderate-to-severe defoliation on the south-central boundary of Quetico Park in the Atikokan District. This infestation totalled some 6,970 ha in the Robinson-Basswood lakes area and extended south into the Superior National Forest of Minnesota. Egg counts in this area indicate that the infestation should persist at about the same level in 1984 and could spread slightly to the north and east towards the Sarah Lake area.

Light damage totalling 150 ha occurred in several jack pine plantations in Huronia, Maple and Lindsay districts, Central Region. In Owen Sound District, Southwestern Region, heavy infestations in 1982 declined to light in 1983.

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd.

The Swaine jack pine sawfly infestation in northeastern Ontario peaked in 1981 when 5,699 ha of jack pine suffered moderate-to-severe defoliation in the Banks-Makobe lakes area of the adjacent Kirkland Lake and Temagami districts. Populations began to decline somewhat in 1982 when the total area affected comprised 4,650 ha (see Fig. 4, Information Report O-X-350, Forest Insect and Disease Conditions in Ontario, 1982).

In 1983, populations declined to the point at which defoliation was insignificant over most of the previously infested areas. Two small pockets of moderate defoliation totalling 518 ha persisted in the Banks-Makobe infestation, north of Banks Lake. These were located in the western part of Banks Township along the Makobe River and in Willet Township, on the southwest side of Alexander Lake. Small numbers of colonies were present in the remainder of the areas infested in 1982 but in all cases defoliation was negligible in 1983.

Deciduous

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

The current outbreak of this late-season defoliator of birch (*Betula* spp.) began in 1981 when approximately 56,700 km^2 of moderate-to-severe defoliation were mapped, primarily in northeastern and northwestern Ontario. That figure increased to about 82,300 km^2 in 1982 more or less in the same areas but with an additional 100 km^2 of moderate-to-severe defoliation in southern Ontario.

In 1983 the total area of moderate-to-severe defoliation was 46,517 km^2 (Fig. 5). This was distributed as follows: Northwestern and North Central regions 1,900 km^2, Northern and Northeastern regions 37,465 km^2, Algonquin Region 4,811 km^2 and Central and Southwestern regions 2,341 km^2. These figures represent a marked increase in the area infested in southern Ontario (+ 7,052 km^2) and substantial decreases in northwestern Ontario (- 23,100 km^2) and northeastern Ontario (- 19,735 km^2).

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Populations of the oak leaf shredder, a serious and widespread pest of red oak (*Quercus rubra* L.) in Ontario, have been on the decline since 1981. Egg surveys carried out in the fall of 1982 indicated that populations would generally remain low in the province with the exception of a few areas in the Central Region. The most significant of these was in the Dufferin County Forest and the adjacent Simcoe County Forest in Tosorontio and Mulmur townships, where valuable stands of red oak were affected. Following egg hatch during the second week in May, populations developed as forecasted. On 24 and 25 May, OMNR treated approximately 579 ha of red oak stands in the Simcoe and Dufferin County forests with the chemical insecticides Sevin-4-Oil and Orthene and the biological insecticide Dipel 88, in an effort to suppress infestations and protect foliage. Some success appears to have been achieved as egg counts throughout the treated areas are considerably reduced in comparison with those of a year ago. Elsewhere in the Central Region populations increased marginally in the Huronia District and declined somewhat in the Maple District. A few pockets of moderate-to-severe defoliation occurred in Tiny Township and on Beausoleil Island in the Georgian Bay Islands National Park, Huronia District while reduced but moderate defoliation persisted in a few areas in Uxbridge Township, Maple District. Apart from areas treated in the Huronia District, about 600 ha of moderate-to-severe defoliation were mapped in the Central Region in 1983 in comparison with about 700 ha in 1982. Elsewhere in Ontario, small pockets of medium infestation occurred in McLean Township, Bracebridge District and in Thessalon and Long townships, Blind River District. A single area of heavy infestation, about 25 ha in size, occurred in Hilton Township on St. Joseph Island in the Sault Ste. Marie District.

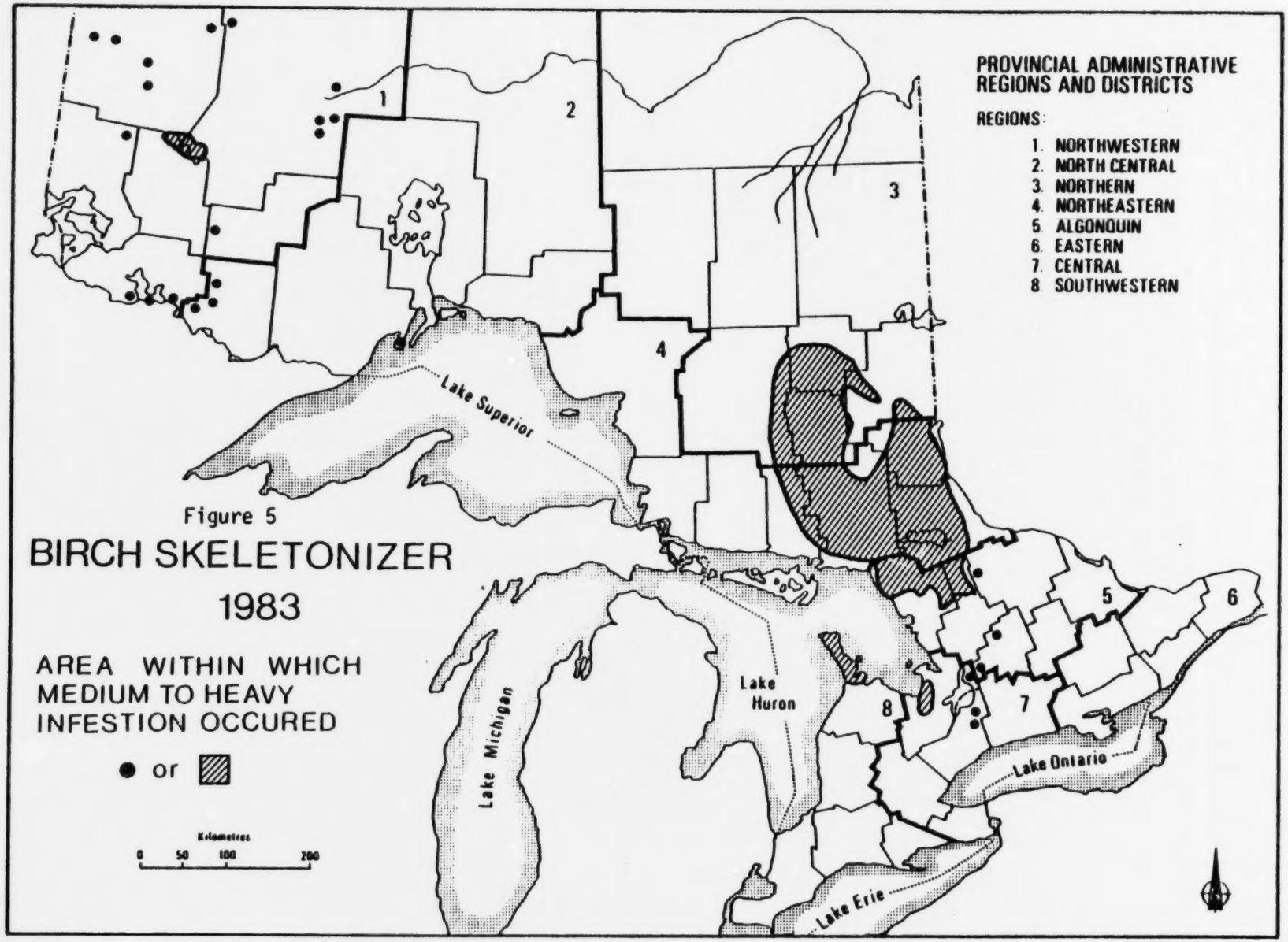


Figure 5

BIRCH SKELETONIZER

1983

During August and September, egg counts were carried out at a number of locations in the Central, Southwestern and Northeastern regions. Results indicate that low populations will occur at all sample points with the exception of one plot in Awenda Park, Huronia District and one plot near Fonthill in the Niagara District where moderate defoliation is predicted.

The Forest Insect and Disease Survey (FIDS) unit maintains some 13 red oak plots in southern Ontario to monitor the condition known as oak decline and to gather basic information on the condition of red oak. When the plots were established in 1977, 100 live trees were marked in each plot. In 1983, mortality among the 1,300 trees held steady at 9.2% in comparison with 9.2% in 1982 and 7% in 1981.

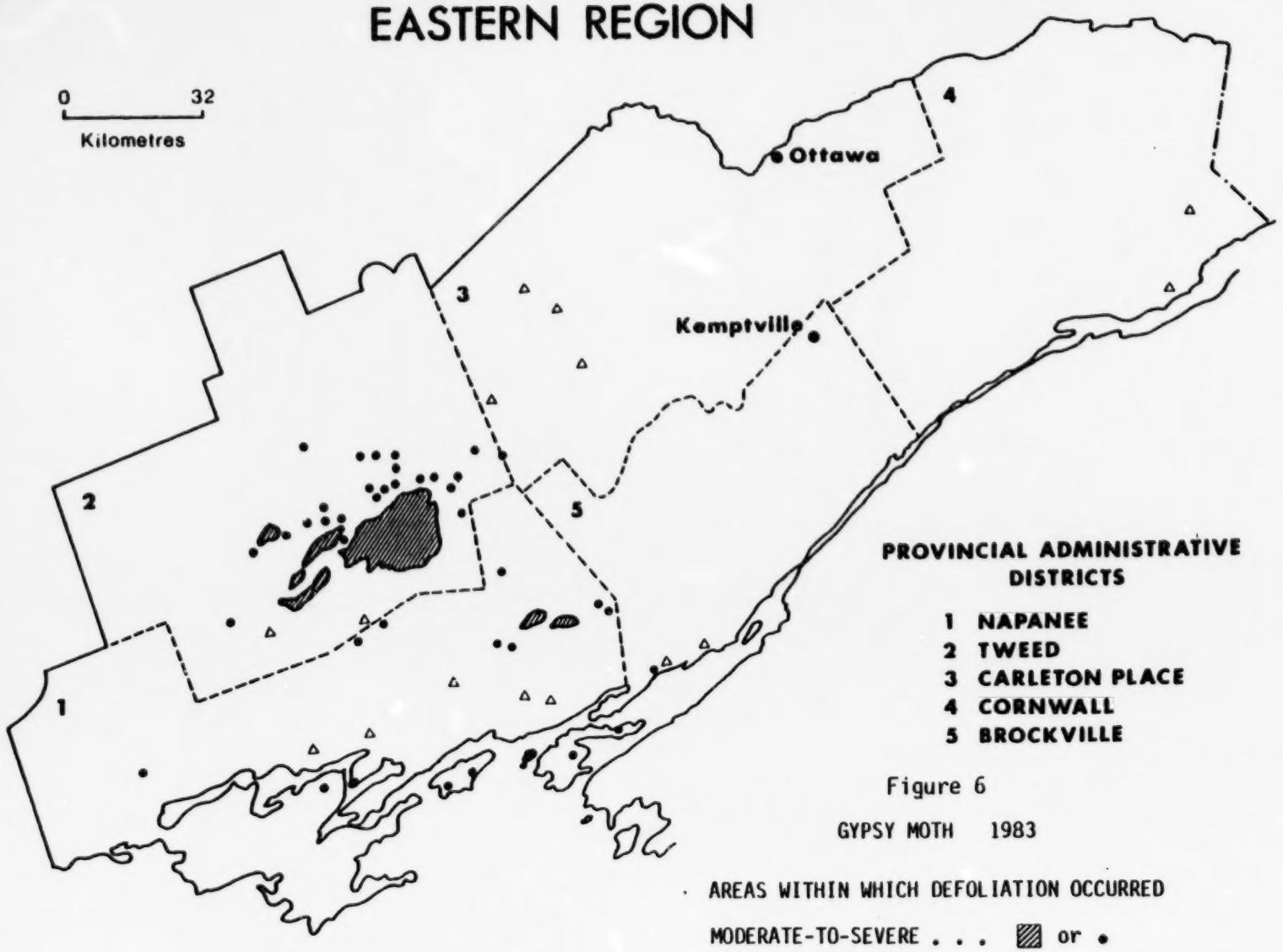
For the past three years the FIDS unit has been conducting field trials with pheromone traps to determine their usefulness in predicting oak leaf shredder populations, and the possibility of their affording a means of replacing the more costly and time-consuming method of egg sampling now employed. This year's program concentrated on testing different concentrations of pheromone and the results are now being evaluated. Results to date indicate that a relationship exists between the number of male moths captured and the number of eggs deposited. However, more work will be needed to determine if this method can be used as an effective operational tool.

Gypsy Moth, *Lymantria dispar* (L.)

Populations of this introduced defoliator increased markedly in the Napanee and Tweed districts of the Eastern Region for the third consecutive year. The total area of moderate-to-severe defoliation in these districts increased from approximately 4,800 ha in 1982 to 40,950 ha in 1983 (Fig. 6). The largest single infestation was located south of the village of Arden and encompassed some 27,722 ha in Kaladar, Olden, Sheffield, and Hinchinbrooke townships. Three sizeable pockets of moderate-to-severe defoliation totalling 3,528 ha were mapped in Kaladar, Hungerford and Sheffield townships west of the main infestation described above.

In the remainder of the Tweed and Napanee districts, 40 smaller pockets were mapped from Mazinaw Lake south to Wolfe Island. These ranged in size from a few to several hundred hectares with a total area of about 9,700 ha. In the remainder of the Eastern Region, the insect was found in varying numbers from Sidney Township, Napanee District, east to the Quebec border.

EASTERN REGION



PROVINCIAL ADMINISTRATIVE DISTRICTS

1 NAPANEE
2 TWEED
3 CARLETON PLACE
4 CORNWALL
5 BROCKVILLE

Figure 6

GYPSY MOTH 1983

AREAS WITHIN WHICH DEFOLIATION OCCURRED

MODERATE-TO-SEVERE . . . ▨ or •

LIGHT . . . . . △

Various types of control operations were carried out in 1982 in small incipient infestations which occurred in the cities of London, Niagara Falls, Kitchener, Oakville and Burlington. All appear to have achieved some degree of success as no larvae were found in 1983 except in the Oakville infestation where Agriculture Canada personnel reported small numbers of larvae at one location.

In 1983 the FIDS Unit and the Parks Branch of OMNR carried out a larval and an adult pheromone trapping program at most provincial parks in southern Ontario.

The larval trapping method takes advantage of the fact that gypsy moth larvae descend the trees during the day to hide. Strips of burlap about 30 cm wide are tied around the trunks of oak trees with a cord in the centre and the top half folded over the bottom half. Gypsy moth larvae take shelter under the strips and are easily captured. FIDS rangers and parks personnel deployed 10 burlap traps in each of 71 parks selected in southern Ontario. Parks personnel inspected the traps periodically during the larval feeding period and suspect larvae were forwarded to the Sault Ste. Marie laboratory for identification. Positive catches were made at the following seven provincial parks in the Eastern Region: Carillon, Silver Lake, Sharbot Lake, Sandbanks, Frontenac, Fitzroy and Bon Echo. Results at all other parks were negative.

A pheromone trapping program designed to catch male moths was carried out at each provincial park in southern Ontario where larval trapping took place. At each park, FIDS and/or parks personnel deployed two pheromone traps. Wherever possible, one trap was placed near the entrance to the park and the other in a camping area. The traps were left in place during the entire adult flight period and collected late in the field season. Captures of adult moths were confirmed at the Sault Ste. Marie laboratory. Positive catches were made at 27 of the 71 parks where trapping was carried out.

As expected, the largest numbers were caught in parks in the Eastern Region where the insect has been present for several years. However, significant numbers of adults were also captured from a number of other parks as follows: Silent Lake (29) (Bancroft District); Darlington (11), Emily (5), Marks Burnham (11) and Serpent Mounds (10) (Lindsay District); Wasaga Beach (6) (Huronia District); Bronte Creek (25) (Cambridge District); and Turkey Point (5) (Simcoe District). Small numbers of adults, usually one or two, were also caught in the following parks: Mikisew (Bracebridge District); Balsam Lake (Lindsay District); Wheatley (Chatham District); Selkirk (Simcoe District); Craigleith (Owen Sound District); Awenda, Bass Lake, Devils Glen, and Springwater (Huronia District); Killbear (Parry Sound District); and Kearny Lake, Lake of Two Rivers, Mew Lake, Coon Lake and Rock Lake campgrounds in Algonquin Park (Algonquin Park District).

Since 1979, FIDS staff have carried out a separate gypsy moth pheromone trapping program in northern Ontario in cooperation with Agriculture Canada. Some 90 pheromone traps were deployed in 35 provincial parks and private campgrounds in the Northern, North Central and Northeastern regions in 1983. Particular attention in the form of extra traps was paid to White Lake Provincial Park in the Wawa District where a single male moth was captured in 1982. In spite of this, the collection was not repeated in 1983. Results from other parks were also negative except for Samuel D. Champlain Provincial Park near Mattawa in the North Bay District, where a single male moth was captured. Increased emphasis will be placed on trapping operations in this park in 1984.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Populations of the forest tent caterpillar which have declined steadily since 1978 continued on a downward trend this year. A total area of 30,600 ha of moderate-to-severe defoliation was mapped in 1983 in contrast with 103,700 ha in 1982 and 228,000 in 1981.

The largest remaining infestation is located in the Slate River Valley, southwest of the city of Thunder Bay in the Thunder Bay District. Here, a total area of 26,500 ha was infested in the townships of Blake, Pearson, Crooks, Scoble, Gillies and Paipoonge. Populations which were expected to develop north and west of the city of Thunder Bay in Oliver, McIntyre and Conmee townships failed to materialize although occasional wandering larvae were observed at a number of points. Egg-band counts made in September indicate that populations will probably decline somewhat in 1984 and the area infested should also be reduced next year.

Populations in the Northern Region, which were expected to remain unchanged or to increase, suffered a major decline in 1983. The infestation which persisted for a number of years north of the town of Cochrane in Cochrane District and totalled 32,456 ha in 1982, collapsed this year, and no defoliation was detected by aerial surveys. A new infestation, detected last year northeast of the town of Matheson on the Cochrane-Kirkland Lake district boundary, was expected to increase this year, but instead it declined from 29,600 ha in 1982 to 4,100 ha in 1983. There is some evidence that inclement spring weather may have been a major factor in the decline of both infestations. Early checks showed relatively high emergence of larvae from egg bands but aspen (*Populus* spp.) was not developed and indeed in some areas did not flush until 31 May, a fact which suggests that many of the early-hatched larvae starved to death.

Egg-band counts made in the infestation northeast of Matheson suggest that high populations will occur in about the same area in 1984.

In the Northeastern Region the old infestation in Shakespeare, Merritt, Hallam, and May townships of Espanola District collapsed as expected this year. Only very low numbers of larvae were encountered in the previously infested area.

MAJOR FOREST DISEASES

Coniferous

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

This coniferous disease is caused by two races of the fungus *G. abietina*. The European race has been detected in New York, Vermont and Maine in the eastern United States, and in Maine, New Brunswick and Newfoundland in eastern Canada. The North American race is widely distributed in Canada although a large part of southern Ontario is free of the disease.

In Ontario, surveys for the European race have been concentrated in the southern part of the province, particularly the Eastern Region, which is closest to infection centres in New York state and Quebec. Annual detection work consists of an aerial survey of southern Ontario, with follow-up ground checks of any suspect damage, detailed searches of some 70 large plantations, and visual checks of most pine stands encountered by rangers during routine field work. In spite of this high level of detection activity, which has been carried out annually since 1978, the European race has not yet been found in Ontario.

Surveys for the North American race, particularly in northeastern Ontario, were hampered in some areas by the presence of old needle droop damage which occurred in the fall of 1982 and early in the 1983 growing season. In 1983, reports of the North American race were received from the Geraldton, Blind River, Sault Ste. Marie, Parry Sound and Bracebridge districts. In most cases levels of infection were low and damage was insignificant. However, in Bethune and Macauley townships, Bracebridge District, single red pine (*Pinus resinosa* Ait.) plantations had moderate levels of infection although damage in most cases was confined to the lower branches.

Larch Needle Cast, *Meria laricis* Vuill.

This needle disease of larch (*Larix laricina* [Du Roi] K. Koch) caused by the fungus *Meria laricis* was collected for the first time in eastern North America in 1983 when it was discovered in a 9-ha European larch (*Larix decidua* Mill.) plantation (12 m high) at the Chatsworth Fish Hatchery in Sullivan Township, Owen Sound District. This is also the first time that the disease has been found in North America on European larch. At this location, 67% of the trees were infected, with actual foliage damage of 23%. Follow-up surveys in other larch plantings in the immediate area failed to detect the organism; however, it was found at one other location in Harwich Township, Chatham District where approximately 30 ornamental European larch, each 3 m high, were heavily

infected. The disease has apparently been present for some time at this latter location, as a few trees have died and branch mortality is evident on others. Leaf cast of larch is known to occur in British Columbia and Alberta (on the B.C. border) on western larch (*Larix occidentalis* Nutt.) and is a serious pest of larch seedlings in the United Kingdom.

Damage caused by the fungus resembles that caused by frost, in that needles turn brown at the base or middle of the new shoots and eventually drop from the tree. Spore clusters are produced which emerge through stomata on the lower and occasionally the upper surface of the needle. These appear as white dots along the needle surface and are somewhat difficult to detect. The fungus overwinters on fallen needles or on clusters of needles which may remain attached to the twigs. Surveys will continue in 1984 to determine the distribution of the fungus.

Tip Blight, *Sphaeropsis sapinea* (Fr.) Dyko. and Sutt. (= *Diplodia pinea* [Desm.] Kickx.)

This disease has been detected with increasing frequency in the southern part of the province since 1977. *S. sapinea* has been recovered from most species of pine in Ontario; however, the native species, white pine (*Pinus strobus* L.), red pine, and jack pine, rarely suffer severe damage. Imported species, particularly Scots pine (*P. sylvestris* L.) and Austrian pine (*P. nigra* Arnold), are often severely affected and instances of heavy mortality have been reported. In 1983, high levels of infection were reported from Scots pine plantations at several locations in the Maple and Cambridge districts of the Central Region and from the Wingham District of the Southwestern Region. Lower levels of infection in the moderate range were reported from Cramahe and Clarence townships in the Eastern Region. The incidence of infection ranged from 75 to 100% with mortality as high as 19% (Table 4).

Table 4. Summary of damage caused by *Sphaeropsis sapinea* in five Scots pine plantations in southern Ontario in 1983.

District	Township	Tree ht (m)	Area affected (ha)	Trees affected (%)	Trees severely affected[a] (%)	Trees dead (%)
Maple	Uxbridge	13	8	79	26	2
	Whitchurch	17	5	75	9	0
Cambridge	Beverly	11	10	96	49	19
	Nassagawaya	11	6	99	63	7
Wingham	East Wawanosh	10	30	30	100	7

[a] more than 50% of foliage affected

ABIOTIC

Needle Droop

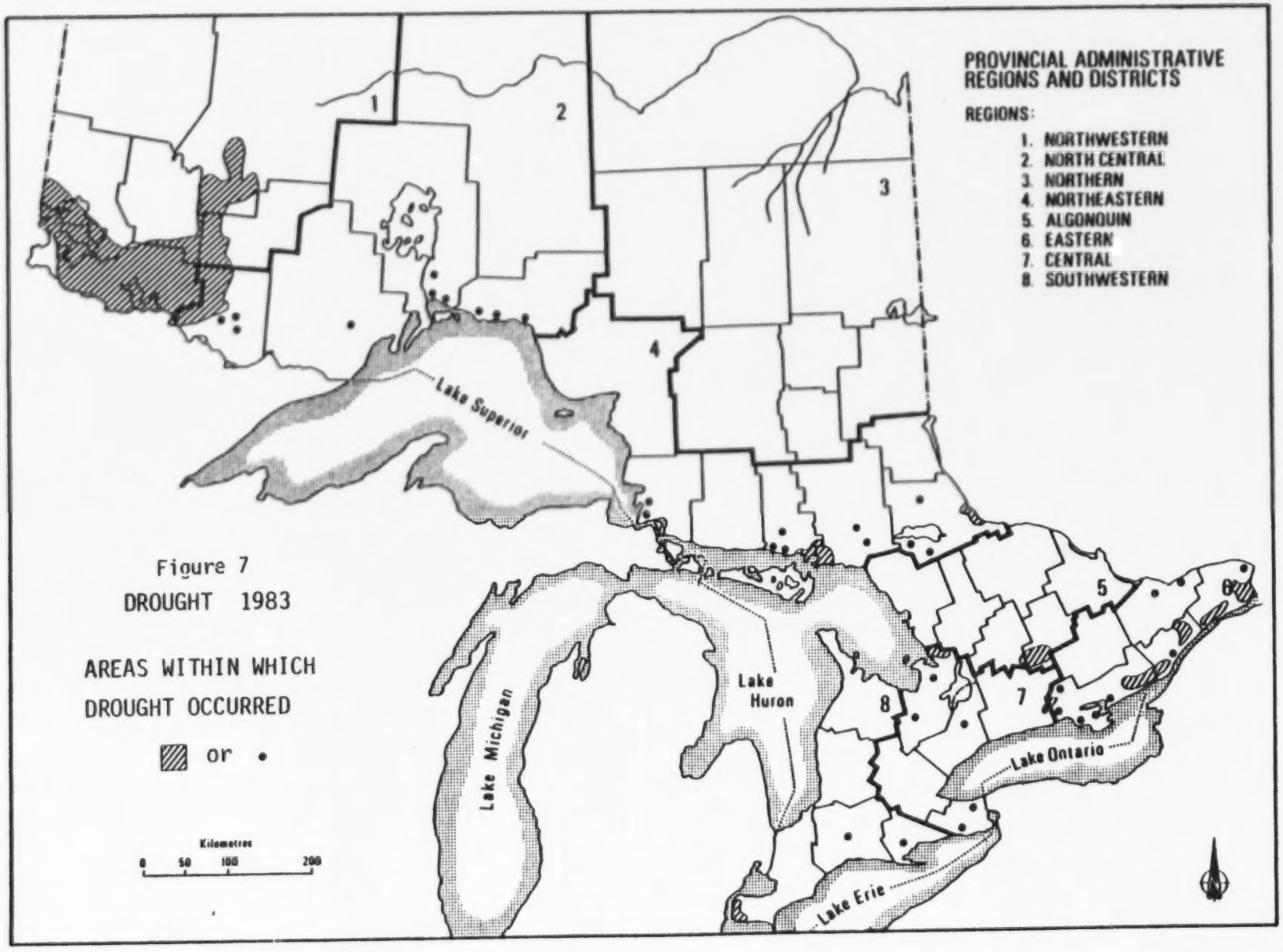
In the late summer and fall of 1982, surveys revealed that the current foliage in 2,000 to 3,000 ha of young red pine plantations in the Blind River and Espanola districts of the Northeastern Region had been severely damaged by needle droop (see Forest Insect and Disease Conditions in Ontario, 1982). Similar damage, though less severe and not as widespread, occurred in a few plantations in the Minden, Bracebridge and Parry Sound districts of the Algonquin Region. Follow-up surveys carried out in 1983 showed that in a number of areas in the Blind River and Espanola districts, buds set in the summer of 1982 failed to flush in the spring of 1983. This was a particular problem when complete bud failure and tree mortality occurred or when the terminal bud failed, and loss of tree form resulted. In some instances, the buds flushed but ensuing growth was stunted and the new foliage became chlorotic later in the summer. Evaluations carried out in a number of plantations showed that the incidence of severe damage (terminal shoot destroyed) ranged from 0.6% to 59% and tree mortality was as high as 11%. The affected plantations will be kept under observation in order that the long-term effects of this condition may be recorded. Some droop occurred again in 1983 although there were no new areas of severe damage.

Drought Damage

Unusually high temperatures and low rainfall during a large part of the 1983 growing season caused varying degrees of drought damage across the province. A variety of tree species were affected but generally white birch (*Betula papyrifera* Marsh.) and trembling aspen (*Populous tremuloides* Michx.) and to a lesser extent jack pine and red pine were affected in northern Ontario. Maple (*Acer* spp.) and oak (*Quercus* spp.) along with white pine were damaged in southern Ontario. The trees affected were usually growing on poor sites, such as thin sandy soils, rocky ridge tops or lakeshores.

The most widespread damge occurred in northwestern and southeastern Ontario. In northwestern Ontario, white birch and trembling aspen in a large area from the Manitoba border east to the Atikokan District (Fig. 7) showed early discoloration of foliage and premature leaf drop. Scattered pockets of jack pine and red pine mortality ranging from a few trees to about 5 ha were detected in the southern Kenora and Fort Frances districts. The total area within which this type of damage occurred in northwestern Ontario was about 27,200 km^2.

In southeastern Ontario drought damage occurred in large patches in the Cornwall, Brockville and Napanee districts of the Eastern Region and the Bancroft and Minden districts of the Algonquin Region. Damage


PROVINCIAL ADMINISTRATIVE REGIONS AND DISTRICTS
REGIONS:
1. NORTHWESTERN
2. NORTH CENTRAL
3. NORTHERN
4. NORTHEASTERN
5. ALGONQUIN
6. EASTERN
7. CENTRAL
8. SOUTHWESTERN
Lake Superior
Lake Michigan
Lake Huron
Lake Ontario
Lake Erie
Kilometres
0 50 100 200
Figure 7
DROUGHT 1983
AREAS WITHIN WHICH
DROUGHT OCCURRED
or

was recorded within a total area of about 1,150 km^2 in this part of the province. The most severe damage occurred in Burleigh Township, Bancroft District where evaluations showed mortality of red oak as high as 46%.

Less severe damage, usually in the form of discolored foliage on single trees and small clumps of trees, was reported sporadically in the Central Region and the southern part of the Southwestern Region. Similar damage was recorded in the Sudbury, Espanola and North Bay districts of the Northeastern Region and in the Nipigon and Terrace Bay districts of the North Central Region.

SPECIAL SURVEYS

White Pine Plantations

A special survey of white pine plantations was carried out in southern Ontario in 1983. This was part of a continuing program to establish baseline information about a number of insect and disease pests affecting the more important coniferous species in Ontario. White pine was previously surveyed in 1980 (40 plantations, 6,000 trees) and the results of that effort are compared with results from the 1983 (42 plantations, 6,300 trees) survey below.

The white pine weevil, *Pissodes strobi* (Peck), was the most abundant insect encountered, affecting 426 of the 6,300 trees examined or 6.8% of the total. This is a slight reduction from the 1980 survey when 8% of the trees examined were attacked. The insect was found in 25 of the 42 plantations surveyed, or 60% of the total, in comparison with 53% of the total in 1980. In most instances only trees under 6 m high were affected. The most severe damage was recorded in Foster Township, Espanola District where 60% of the trees were infested.

The second most abundant insect was the pine bark adelgid, *Pineus strobi* (Hartig), which was found on 343 trees or 5.4% of the total. This was a marked decline from 1980 when it infested 12% of the trees examined, and was the most abundant insect found. The pine bark adelgid was present in 50% of the plantations examined in comparison with 57.5% in 1980, and was found on trees of all size classes.

Although the pine spittlebug, *Aphrophora cribrata* (Say), was found in 21 plantations as opposed to eight in the 1980 survey, it attacked fewer trees--251, or 4.0% of the total in comparison with 7% in 1980. For the most part trees under 6 m were attacked; however, at one location in Edwardsburgh Township, Brockville District, 23% of the 15-m trees examined were infested. In all cases, damage was negligible.

The pine false webworm, *Acantholyda erythrocephala* (L.), was found in one less plantation in 1983 (four in comparison with five in 1980), but attacked more trees (193 in 1983 in comparison with 23 in 1980). Three of the four plantations affected were in the Central Region, with the most severe damage in Bexley Township, Lindsay District, where 88% of the trees were infested with defoliation averaging 46%.

The eastern pine shoot borer, *Eucosma gloriola* Heinr., increased slightly in 1983, affecting 0.6% of the trees examined in comparison with 0.05% in 1980. In both surveys damage was insignificant.

The following insects were also encountered in small numbers during the survey: a sawfly, *Acantholyda* sp. (one plantation); the introduced pine sawfly, *Diprion similis* Htg. (two plantations); the webbing coneworm, *Dioryctria disclusa* Heinr. (one plantation); the gypsy moth,

(one plantation); the pine bark weevil, *Pissodes affinis* Rand. (one plantation); the northern pine weevil, *P. approximatus* Hopk. (one plantation); an elm leaf beetle, *Trirhabda borealis* Blake (one plantation); the pitch mass borer, *Synanthedon pini* (Kell.) (one plantation); and the white pine needlesheath mite, *Trisetacus alborum* Keifer (two plantations).

As expected, the most important disease encountered in the survey was white pine blister rust, *Cronartium ribicola* J.C. Fisch. It was found in 17 plantations (40% of those examined). A total of 96 trees (1.5%) were diseased and of these 52 (0.8%) had stem cankers. In 1980, 198 trees (3.1%) were infected, with 96 (1.5%) of these supporting stem cankers. The highest incidence of the disease in 1983 was in a 12-m plantation in Hagerman Township, Parry Sound District where 15% of the trees were infected, including 7% with stem cankers.

Foliar damage was present in 36% of the plantations examined. In most cases abiotic agents such as needle droop or winter drying were responsible for the damage; however, the needle cast fungi, *Lophodermium* sp. and *L. nitens* Darker, were each found in one plantation.

Armillaria root rot, *Armillaria mellea* (Vahl ex Fr.) Kummer, and basal stem cankers caused by a number of agents were found in two and five plantations, respectively. In all cases, fewer than five trees were affected.

Semimature tissue needle blight, which is caused by air pollution (usually ozone or sulphur dioxide), was not encountered in the 1983 survey. It was found in two of the plantations surveyed in 1980.

Black Spruce Plantations

A survey of black spruce plantations was the northern Ontario counterpart of the southern Ontario white pine survey. The results of the 1983 survey (38 plantations, 5,700 trees) are compared with those from a similar survey conducted in 1980 (33 plantations, 4,950 trees).

The most abundant insect was the spruce budworm; however, it was encountered in numbers considerably lower than those found in 1980. In all, 362 trees or 6.4% of the total were attacked in 1983 in contrast with 1,631 trees or 33% of the total in 1980. Budworm was found in nine plantations in 1983 in contrast with 19 in 1980, and all but two of these were in northwestern Ontario. This may be a reflection of the spruce budworm situation in general, which shows that budworm populations have generally been rising in northwestern Ontario and declining in northeastern Ontario.

The yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.), was found in 12 plantations and attacked a total of 128 trees. In 1980,

it was found in only one plantation and on 35 trees. Although the insect was present in 12 plantations, damage was minor except in Stock Township, Kirkland Lake District, where 72 of 150 trees examined were infested and defoliation of affected trees averaged 37%.

The other three insects surveyed for, i.e., the white pine weevil, sawyer beetles, *Monochamus* spp., and the spruce coneworm, *Dioryctria reniculelloides* Mut. & Mun., were of minor importance. White pine weevil was found on 18 trees, spruce coneworm on 12 and sawyer beetle damage was found on three trees. The populations of all three were at levels similar to those found in the 1980 survey.

In addition to the above insects, for which specific searches were conducted, a number of others were also encountered during the survey. Most were found in only a few areas and none caused serious damage. They are listed below in order of abundance: pale spruce gall adelgid, *Adelges strobilobius* Kalt., spruce bud midge, *Rhabdophaga swainei* Felt, a webspinning sawfly, *Cephalcia* sp., eastern blackheaded budworm, *Acleris variana* (Fern.) and the fir coneworm, *Dioryctria abietivorella* (Grt.).

Spruce needle rusts, *Chrysomyxa ledi* (Alb. & Schw.) d By. and *C. ledicola* Lagh., were the principal diseases encountered in the survey. A total of 1,003 trees (17%) were infected. Trees of all height classes were attacked but defoliation was less than 10%, except in single plantations in the Harmon Lake area of Thunder Bay District and in Floranna Township, Chapleau District. In these plantations, average defoliation was 16 and 12%, respectively. In 1980 these rusts were found in only three plantations and less than 10% of the trees were affected.

The only other diseases observed were Armillaria root rot, which affected a total of four trees in three plantations in the Geraldton District and dwarf mistletoe, *Arceuthobium pusillum* Pk., which was found on one tree in Panet Township, Chapleau District and on one tree in the Cushing Lake area of Thunder Bay District.

Winter drying was evident on 314 trees in five plantations in the Northwestern Region. All were less than 2 m high and foliar damage was usually less than 2%. However, at two locations, in Furniss Township, Ignace District and near Kawawia Creek in Fort Frances District, average foliar damage was 18.5% and 36.2%, respectively. In the 1980 survey, frost damage was recorded at a few locations in the Northern Region and winter drying was not found.

Seed and Cone Pests of White Pine

This year the FIDS unit conducted a special survey of white pine cones in southern Ontario. This was part of a continuing program to assess the pest problems associated with seed production on the major coniferous species in Ontario. Each FIDS ranger in southern Ontario and the Northeastern Region attempted to collect 100 green second-year cones which were shipped to the Sault Ste. Marie laboratory for dissection and identification of pests. As a result of a very sparse cone crop in 1983, it was not possible in most cases to collect the full 100 cones.

Of the total cones examined, 22% were damaged by insects with damage ranging from 0 to 74%. Seed loss within damaged cones ranged from 0.1% to 19.5% (Table 5). The principal insects causing damage included the white pine coneworm, *Eucosma tocullionana* Heinr., the white pine cone beetle, *Conophthorus coniperda* (Sz.), the fir coneworm, the webbing coneworm, *Dioryctria disclusa* Heinr., a dipterous larva, *Resseliella* sp., a cone resin mide, *Asynapta* sp., and an unidentified lepidopterous insect which affected cones in three collections. Minor damage by Cecidomyid and *Dioryctria* larvae which could not be identified by species was also noted.

Table 5. Summary of cone and seed damage in white pine in southern Ontario.

Location	No. of cones examined	Cones damaged (%)	Seed loss within damaged cones (%)	Principal cause of seed loss
Essa Township Huronia District	50	0	0	None
Buchanan Township Pembroke District	43	74.4	10.8	*Eucosma tocullionana* *Dioryctria abietivorella* *Resseliella* sp.
South Walsingham Township Simcoe District	50	4.0	0.1	Lepidopterous larvae Unknown, probably mechanical
Cambridge Township Cornwall District	20	55.0	19.5	*Eucosma tocullionana* *Dioryctria abietivorella* *Resseliella* sp.
Edwardsburgh Township Brockville District	39	28.2	10.5	*Eucosma tocullionana* *Dioryctria abietivorella* *Conophthorus coniperda*
Kirkwood Township Blind River District	70	20.0	12.3	*Eucosma tocullionana* *Conophthorus coniperda* Unknown (mechanical)
Gurd Township North Bay District	100	12.0	2.8	*Eucosma tocullionana* *Conophthorus coniperda* *Resseliella* sp.
Total =	372	$\bar{x}$ = 22	$\bar{x}$ = 10	

Seed and Cone Pests of Black Spruce

A survey of black spruce seed and cone pests was carried out as the northern Ontario counterpart of the southern Ontario survey of white pine seed and cone pests. The methodology in both surveys was similar. Each ranger in northern Ontario attempted to make two collections of 100 black spruce cones, one each from a lowland and upland site. The cones were shipped to the Sault Ste. Marie laboratory for dissection and identification of pests.

Over all, 45% of the cones examined were damaged by insects. The proportion of damaged cones ranged from 17 to 81% for the 14 locations. Actual seed loss within damaged cones was 18.6% over all and ranged from 4.1 to 47%. The principal agents causing seed loss were as follows: the spruce cone maggot, *Hylemya anthracina* (Czerny); the spruce cone axis midge, *Dasineura rachiphaga* Tripp; the spruce cone gall midge, *Dasineura canadensis* Felt; the fir coneworm; the spruce micro moth, *Paralobesia piceana* Free.; the white pine coneworm, and a dipterous larva, *Resseliella* sp. Unknown lepidopterous larvae, as determined by typical feeding damage and other unknown agents, also caused significant losses at some locations. A more complex summary of the results at sample locations will be found in Table 6.

In addition to the insect pests described above, the spruce cone rust, *Chrysomyxa pirolata* Wint., was recovered from one location in Geraldton District. However, only one cone was infected and seed loss attributable to the disease within this single cone could not be determined.

Table 6. Summary of seed and cone damage to black spruce in northern Ontario in 1983.

District	Location	No. of cones examined	Damaged cones (%)	Seed loss within damaged cones (%)	Site[a]	Principal causes of seed loss[b]
Kirkland Lake	Burt Twp	100	17	5.5	up	1,2,7
	Burt Twp	100	40	9.5	up	1,2,6,7
Chapleau	Panet Twp	100	23	5.1	up	1,2,6
	Brutus Twp	100	25	7.5	low	1,2,6,7
Kapuskasing	Beartooth Lake SPA	100	49	24.4	up	1,2,6,7
	McCrea Twp	100	69	47.0	low	1,2,6,7
Geraldton	Croll Twp	100	81	46.0	low	1,3,6,8
	K-C SPA, Longlac	100	26	10.2	up	1,2,6
Thunder Bay	MacGregor Twp	100	58	10.7	low	1,2,7
	O'Connor Twp	100	50	4.1	up	1,2,5
Sioux Lookout	Marchington Rd	100	75	19.1	low	1,2,4,9,10,3,6
	McAree Twp	99	46	20.9	up	1,3,10,6,4
Dryden	Snake Bay Rd	100	27	6.0	up	1,2
	Hwy 502	100	25	32.0	low	1,2,6
	Total =	1399	$\bar{x}$ = 45	$\bar{x}$ = 18.6		

[a] up = upland; low = lowland

[b] 1 = *Hylemya anthracina*
2 = *Dasineura rachiphaga*
3 = *Dioryctria abietivorella*
4 = *Resseliella* sp.
5 = *Dasineura canadensis*
6 = lepidopterous larvae
7 = unknown agent
8 = disease - *Chrysomyxa perlata*
9 = *Eucosma tocullionana*
10 = *Paralobesia piceana*

CONTROL PROGRAMS

Spruce Budworm

In 1983, a total area of 3,502 ha in the Hearst District, Northern Region was sprayed aerially against spruce budworm for the purpose of preserving as much of the current foliage as possible. Some 2,600 ha of commercial forest and 902 ha of high-value stands (provincial parks, plantations and a moose yard) were treated with biological and chemical insecticides. Included in the 902 ha were seven experimental areas totalling 340 ha that were sprayed with various *Bacillus thuringiensis* (*B.t.*) formulations. *B.t.* was applied operationally to 2,763 ha and experimentally to 340 ha whereas aminocarb (Matacil) was applied operationally to 399 ha. *B.t.* comprised 87% of the area sprayed operationally in 1983.

The role of the Canadian Forestry Service (FIDS Unit, Great Lakes Forest Research Centre) in relation to insect control programs in Ontario is to provide the information required for decision making on forest insect control programs and, specifically, to provide advice and assistance to OMNR in planning and evaluating control operations. FIDS provides the biological information necessary for planning and timing operations and biologically assessing the various treatments. In addition, special surveys are conducted in sprayed and unsprayed stands to determine egg-mass densities, current and accumulated defoliation, stand condition and potential for future damage.

In 1983, budworm emergence in the Hearst District was delayed by cool, wet weather by some two weeks or more and in several areas emergence did not occur until the first week of June. Warmer-than-normal temperatures in June and early July tended to compensate for the cool May temperatures and budworm larval development progressed rapidly. Spraying began on 13 June when larvae were in third and fourth instar and was completed by 20 June when the majority of budworm were in fourth and fifth instar.

The commercial forest treated was in McEwing Township and consisted of 1,390 ha sprayed with Dipel 88 and 1,210 ha with Novabac 3. Both treatments were applied at 20 BIU/5.9 l/ha. Budworm populations were low and results were fairly good in terms of foliage protection. High-value areas treated included 123 ha at Nagagamasis Provincial Park (with Dipel 88) and 40 ha at Fushimi Provincial Park (with Novabac 3). Both applications were 20 BIU/5.9 l/ha, and in both cases, budworm populations were low and foliage protection was good. White spruce plantations in Rogers Township totalling 214 ha and a 185-ha moose yard in Chelsea Township were treated with Matacil at 90 g/3.0 L/ha. In both cases, populations were moderate to high. Foliage protection was excellent in the plantations but poor in the moose yard.

Six experimental trials totalling 280 ha and involving several formulations of Dipel 88 (6L and 8L) were carried out in white spruce plantations in Rogers Township. Dosages were kept constant at 30 BIU/ha; however, each formulation of Dipel 88, 6L or 8L was applied at two rates: directly from the barrel or in a 50:50 dilution with water. Consequently, application rates varied from 1.75 L/ha to 7.0 L/ha. Resulting budworm populations were high; foliage protection was variable but generally poor or moderate. A 60-ha stand of mature white spruce in Frost Township was treated with Bactospeine at 30 BIU/4.7 L/ha. Resulting populations were moderately high, and foliage protection, as a result of the treatment, was good.

Oak Leaf Shredder

Defoliation by the oak leaf shredder is probably a major predisposing factor in oak decline, dieback and tree mortality. Serious damage has occurred in many areas in Ontario, and there is a history of persistent infestations of this insect and associated species. Between 1973 and 1980, almost 3,000 ha of oak forest in Huronia District were aerially treated with carbaryl (Sevin-4-oil) and acephate (Orthene) to reduce populations and minimize defoliation by this insect.

In 1983, OMNR aerially treated 579 ha of oak-maple forest in Dufferin County Forest and adjacent areas in Simcoe County Forest, Huronia District. Acephate (Orthene 97 SP) was applied at two dosages (.84 kg/9.4 L/ha and .56 kg/9.4 L/ha) to approximately 195 ha. Carbaryl (Sevin-4-oil) was applied to 320 ha at 1.1 kg/9.4 L/ha. Dipel 88 was sprayed on 64 ha at 40 BIU/4.7 L/ha. This is the first time that *B.t.* has been used against the oak leaf shredder in Ontario.

FIDS staff monitored insect and host development and assessed the effectiveness of each treatment. Spraying took place on 24 and 25 May when larvae were predominantly in the first and second instar and red oak buds had flushed with leaves about 4 cm in length. Both Sevin and Orthene (two dosages) were very effective in reducing populations and preventing defoliation. In contrast, the Dipel treatment was less effective but promising enough to warrant further testing.

OTHER NOTEWORTHY INSECTS AND DISEASES

Forest pests of less importance in 1983 are included in the following tables to provide information on the history and fluctuation in populations of these pests.

Forest insect pests and diseases are listed alphabetically by common name. Each organism listed is rated according to its importance as follows:

A - of major importance, capable of killing or severely damaging trees or shrubs;

B - of moderate importance, capable of sporadic or localized injury to trees or shrubs;

C - of minor importance, not known to present a threat to living trees or shrubs.

OTHER NOTEWORTHY INSECTS AND DISEASES

Insect or Disease	Host(s)	Locality	Remarks	Rating
Alder flea beetle *Altica ambiens alni* Harr.	alder	Thunder Bay, Chapleau and Kirkland Lake districts	numerous areas of severe defoliation	C
Ambermarked birch leafminer *Profenusa thomsoni* (Konow)	white birch	Marathon area, Terrace Bay District	high incidence on open-grown trees	B
American aspen beetle *Gonioctena americana* (Schaef.)	trembling aspen	Kirkland Lake, Timmins, Chapleau, Gogama, Napanee and Cornwall districts	light-to-moderate defoliation common, particularly on aspen regeneration	B
Annosus root rot *Heterobasidion annosum* (Fr.) Bref.	pine	Huronia, Brockville and Cornwall districts	ten small, active pockets recorded	A
Anthracnose *Discula umbrinella* (Berk. & Br.) Sutt.	white ash	Cambridge District	affecting small numbers of understory trees in several areas	B
		Lindsay District	commonly found throughout the district	
Armillaria root rot *Armillaria mellea* (Vahl ex Fr.) Kummer	deciduous and coniferous trees	province-wide	Of the areas examined only 54% produced positive results, with an average infection of 2%.	A
Aspen leafblotch miner *Phyllonoryoter ontario* (Free.)	trembling aspen	across northern Ontario and south to Pembroke District	Heavy damage to scattered regeneration aspen was common; an area of 3,000 ha was aerially mapped in Sioux Lookout District.	B
Aspen leafroller *Pseudexentera oregonana* Wlshm.	trembling aspen	Monteagle Twp, Bancroft District; Patience Twp, Nipigon District; Goldfield Road area, Geraldton District and along Hwy 17, Terrace Bay District	generally low numbers encountered	A
Balsam fir sawfly *Neodiprion abietis* complex	balsam fir	King Twp, Maple District	7 ha of moderate infestation in 1982 reduced to light	A
		Parry Sound, Minden, Bracebridge, Atikokan and Thunder Bay districts	trace to light defoliation at a few locations	

(cont'd)

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Balsam poplar leaf beetles *Chrysomela* spp. *Altica populi* Brown	balsam poplar	Pembroke, Bancroft, Carleton Place and Tweed districts	Unusually heavy infestations caused severe browning of balsam poplar within an area of approximately 27,000 ha.	C
		Brockville and Napanee districts	scattered pockets of moderate-to-severe damage within an area of about 4,900 ha	
Balsam poplar leafblotch miner *Phyllonoryctor nipigon* (Free.)	balsam poplar	Red Lake, Sioux Lookout and Ignace districts	high numbers observed throughout this area	B
		Zealand Twp, Dryden District	moderate population levels	
		Ottaway and Clute townships, Cochrane District	high numbers	
Basswood casebearer *Coleophora tiliaefoliella* Clem.	basswood	Pembroke District	Feeding in conjunction with the fall cankerworm, *A. pometaria* (Harr.), caused moderate defoliation of small clumps of mature basswood trees in Horton and McNab townships	C
Birch-aspen leafroller *Epinotia solandriana* L.	birch poplar	Fort Frances, southern Dryden, Wawa, Terrace Bay, Chapleau and Gogama districts	reported in low numbers throughout area	B
		Timmins, Temagami and Kirkland Lake districts	increased populations but usually at low levels	
Birch leafminer *Fenusa pusilla* (Lep.)	white birch	southern Ontario	heavy infestations in urban and fringe areas common throughout; damage to forest trees reported in several areas in the Central Region	A
		northern Ontario	particularly heavy infestations in about 250 ha of forest trees in the Kirkland Lake, Timmins, Hearst, Cochrane, Gogama and Chapleau districts; common in varying degrees of infestation as far west as Atikokan District	

(cont'd)

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Birch sawfly *Arge pectoralis* (Leach)	white birch	Bruce Peninsula, Owen Sound District	moderate-to-severe damage on scattered individual trees at several locations	B
		Kemptville and Brockville districts	low numbers on ornamentals	
Black knot *Apiosporina morbosa* (Schw.) Arx	cherry	Fort Frances District	severe damage observed on fringe trees near Bear Pass	B
Bronze birch borer *Agrilus anxius* Gory	white birch	Carleton Place and Brockville districts	common on ornamentals	B
		Red Lake District	no further report after serious damage reported in 1982	
Brown spot needle blight *Scirrhia acicola* (Dearn.) Siggers	pine	Bruce Twp, Owen Sound District	new area of moderate damage observed on ornamental mugho pine in Inverhuron Provincial Park	A
		Amabel Township, Owen Sound District Tiny Township, Huronia District	status unchanged from 1981 and 1982	
Cedar leafminers *Argyresthia thuiella* (Pack.) *A. canadensis* Free., *A. aureoargentella* Brower, and *Pulicalvaria thujaella* (Kft.)	eastern white cedar	Central and Eastern regions	Moderate-to-severe browning was evident through parts of Cambridge, Maple, Huronia and Lindsay districts extending to the Napanee District	A
		Southwestern Region	Damage was mostly light; however occasional small pockets of moderate-to-severe damage persisted	
		Espanola	low populations in Carnarvon and Tehkummah twps, Manitoulin Island	
Cherry casebearer (formerly aspen casebearer) *Coleophora pruniella* Clem. (formerly *C. inmotabilis* Braun)	balsam poplar white birch	Kaladar, Hungerford and Kennebec townships, Tweed District	light-to-medium infestations totalling about 5 ha	C
Cherry scallopshell moth *Hydria prunivorata* Ferg.	black cherry	Uxbridge Twp, Maple District	Populations collapsed.	B
		Huronia, Cambridge and Owen Sound districts	low populations common on scattered individual trees	
Comandra blister rust *Cronartium comandrae* Pk.	jack pine	Studholme Twp, Hearst District	trace infection recorded in one plantation	A

(cont'd)

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Cytospora canker *Leucostoma kunzei* (Fr.) Munk	spruce	province-wide	A .5-ha pocket of infection including mortality was recorded in spruce 1-2.5 m high at km 67, Goldfield Road, Geraldton District; elsewhere the disease was reported at light infection levels.	B
Dutch elm disease *Ceratocystis ulmi* (Buism.) C. Moreau	elm	province-wide	range of affected trees similar to that of previous year	A
		towns of Sioux Lookout and Dryden, Northwestern Region	surveys conducted but disease not found	
		towns of Kapuskasing, Smooth Rock Falls and Iroquois Falls, Northern Region	surveys conducted but disease not found	
Eastern blackheaded budworm *Acleris variana* (Fern.)	hemlock spruce balsam fir	Torrance-Milford Bay-Glen Orchard area, Bracebridge District	moderate-to-severe defoliation of scattered eastern hemlock over 14,680 ha	B
		Parry Sound and Minden districts	moderate damage at several points on small clumps of eastern hemlock	
		Aylmer, Huronia, Hearst, Cochrane and Thunder Bay districts	Light populations occurred on hosts at scattered locations.	
Eastern dwarf mistletoe *Arceuthobium pusillum* Pk.	spruce	Huronia District	pocket of 40 dead trees located near C.F.B. Borden	A
Eastern pine shoot borer *Eucosma gloriola* Heinr.	jack pine	northern Ontario	highest populations recorded in the Kirkland Lake and Temagami districts where up to 15% of leaders were damaged; common at low levels (less than 5% of leaders affected) elsewhere	B
Eastern spruce gall adelgid *Adelges abietis* (L.)	white spruce	Kenora District	very common on approximately 2 ha of shoreline trees at South Scot Lake	B
		Southwestern Region	heavy on scattered trees in Colborne, Minto and Ellice twps, Wingham District and on occasional trees near St. Williams, Simcoe District	
Eastern tent caterpillar *Malacosoma americanum* F.	most deciduous species	southern Ontario and the Northeastern Region	generally increased populations	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Elm casebearer *Coleophora limosipenella* Dup.	elm	Niagara District, Central Region	.2 ha of juvenile elm with 80% foliar damage near Vineland; light damage common elsewhere	C
Elm leafminer *Fenusa ulmi* Sund.	white elm	Aylmer District, Southwestern Region	light-to-moderate defoliation of single trees near the town of Aylmer	B
		Central Region	high numbers between Port Hope and Cobourg; common in the Bobcaygeon-Fenelon Falls area, Lindsay District; heavy damage on elm regeneration at scattered points in remainder of the Region	
		Eastern Region	scattered heavy infestations ranging from single trees to .5 ha in Napanee, Brockville and Cornwall districts	
European fruit lecanium *Lecanium corni* Bouché	red oak	Lavant Twp, Carleton Place District, Eastern Region	medium infestation within an area of about 500 ha	B
European pine needle midge *Contarinia baeri* (Prell)	red pine Scots pine	Southwestern Region	moderate leader damage to approximately 25 ha of Scots pine trees in Keppel and Anabel townships, Owen Sound District	B
		Northeastern Region	moderate-to-severe damage in approximately 40 ha of Scots pine plantations in VanKoughnet, Fenwick and Jocelyn twps, Sault Ste. Marie District	B
			no damage evident in areas infested in 1982 in North Bay and Espanola districts	
European pine sawfly *Neodiprion sertifer* (Geoff.)	pine	southern Ontario	Populations remain generally very low.	A
		Northeastern Region	Light infestation required control measures in a 5-ha plantation near Little Rapids, Blind River District	
European pine shoot moth *Rhyacionia buoliana* (Schiff.)	red pine	Aylmer District	Moderate damage recurred in a 1-ha plantation near Pearce Provincial Park. Accumulated damage has caused trees to be severely distorted.	A

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Fall cankerworm *Alsophila pometaria* (Harr.)	deciduous trees	Northwestern Region	moderate-to-severe defoliation of ornamental trees in the towns of Fort Frances, Sioux Narrows, Kenora, Dryden and Sioux Lookout	A
		Central Region	moderate-to-severe defoliation on shoreline trees along the Grand River south of Cambridge in Cambridge District and along the Niagara River from Fort Erie to Niagara-on-the-Lake	
		Algonquin Region	low numbers in Horton and McNabb townships, Pembroke District	
Fall webworm *Hyphantria cunea* (Dru.)	deciduous trees	northern Ontario	low levels in areas where this pest occurred	B
	deciduous trees	Algonquin Region	increased incidence but generally light; high numbers in Burleigh Twp, Bancroft District	
		Eastern Region	common throughout the Region; particularly heavy in Goulbourn Twp, Carleton Place District	
		Southwestern Region	Heavy infestations occurred in the south part of the Region; moderate populations were common in the Wingham and Owen Sound districts.	
		Central Region	high numbers in the north half of the Huronia District; generally light through the remainder of the Region	
Fir coneworm *Dioryctria abietivorella* (Grt.)	black spruce	Northwestern Region	high numbers recorded along Sleen Lake Road, Sioux Lookout District; common through the remainder of the Sioux Lookout, Ignace and Red Lake districts	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Fir coneworm (cont'd) *Dioryctria abietivorella* (Grt.)	black spruce	Geraldton, Terrace Bay, Hearst, Kapuskasing and Cochrane districts	generally small numbers of larvae encountered	
Fireweed rust *Pucciniastrum epilobii* Otth.	balsam fir	Dryden, Fort Frances and Sioux Lookout districts	Areas of high infection were observed along the Vermilion River, Sioux Lookout District and light infections were recorded in other areas	C
Greenstriped mapleworm *Dryocampa rubicunda rubicunda* (Fabr.)	maple	Northwestern Region	trace populations in Fort Frances District	A
	maple	Northeastern Region	heavy infestation over 450 ha in Selby Twp, Temagami District; light-to-moderate populations at locations in Blind River and Sudbury districts	
Gouty oak gall wasp *Callirhytis punctata* (O. & S.)	red oak	Fort Frances District	infested to an extent of four to five galls per tree over 0.5 ha in Atwood Twp	C
Hickory tussock moth *Halysidota caryae* (Harr.)	deciduous trees	Brockville District	common on single trees along the St. Lawrence River; high numbers within an area of 10 ha in Frontenac Provincial Park	C
Hypoxylon canker *Hypoxylon mammatum* (Wahl.) J.H. Miller	aspen	province-wide	common at low incidence in most stands; drought may have precipitated mortality of infected trees in the Eastern Region	A
Ink spot *Ciborinia whetzelii* (Seav.) Seav.	aspen	province-wide	Damage was confined mainly to small (1-ha) pockets of moderate-to-severe defoliaton; average number of trees affected in Pembroke and Algonquin districts was 17% with an average defoliation of 20%. Average defoliation was 68% in Kirkland Lake District and 17% in Timmins and Temagami districts.	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Introduced pine sawfly *Diprion similis* (Htg.)	white pine	Wingham District	Populations collapsed.	C
	white pine	Kenora District	approximately 1,200 ha of severe defoliation (up to 80%) on small scattered islands in the southeast portion of Lake-of-the-Woods	
Imported willow leaf beetle *Plagiodera versicolora* (Laich.)	willow	Central Region	moderate browning of leaves at Earl Rowe Provincial Park, Huronia District and in the Oak Ridges area of the Maple District	B
Jack pine resin midge *Cecidomyia resinicola* (O.S.)	jack pine	Carleton Place District	heavy damage in a 4-ha plantation in Marlborough Twp	C
		Chapleau District	moderate-to-severe shoot damage at a number of locations in the Sultan-Ramsey area; light damage common elsewhere in the district	
Jack pine sawflies *Neodiprion pratti banksianae* Roh.	jack pine	province-wide	low numbers reported at several locations	A
Neodiprion pratti paradoxicus Ross	jack pine pitch pine	Algonquin, Eastern and Southwestern regions	low numbers in Bagot Twp, Pembroke District; traces on pitch pine in Augusta Twp, Brockville District and occasional colonies on jack pine in the Dorchester area, Aylmer District	A
Jack pine tip beetle *Conophthorus banksianae* McPherson	jack pine	Northern and Northeastern regions	low-to-moderate numbers in a total of about 45 ha of planted trees in Ivanhoe Twp, Chapleau District, Victoria Twp, Sudbury District, Curd Twp, North Bay District and Templeton Twp, Hearst District	C
Larch casebearer *Coleophora laricella* (Hbn.)	tamarack larch	northern Ontario	Populations remained very low.	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Larch casebearer (cont'd) *Coleophora laricella* (Hbn.)		Southwestern Region	medium infestations on roadside ornamentals in Aylmer and Wingham districts	
		Central Region	moderate and heavy browning in a total of 35 ha at several locations in the Region	
		Eastern Region	pockets of heavy damage in areas totalling 20 ha	
		Algonquin Region	moderate-to-heavy defoliation in Harvey Twp, Minden District	
Larch sawfly *Pristiphora erichsonii* (Htg.)	tamarack larch	North Central Region	up to 80% defoliation in two separate areas totalling 7 ha in Geraldton District; moderate-to-severe damage in areas totalling 7 ha in Thunder Bay District	A
		Northwestern Region	small, severely infested pockets of 1 ha in Morley Twp, Fort Frances District and in Corman Twp, Ignace District	
		Central Region	declining populations; light-to-moderate damage on 5 ha of larch plantations	A
Large aspen tortrix *Choristoneura conflictana* (Wlk.)	trembling aspen	Central Region	Moderate infestation recurred in over 100 ha in Georgina Twp, Maple District.	B
		Northeastern Region	moderate defoliation over an area of 2,590 ha in the Espanola District	
Leaf-blister fungus *Taphrina caerulescens* (Mont. & Desm.) Tul.	red oak	Chatham and Niagara districts	Moderate foliar damage (20%) was apparent from Pinery Provincial Park to the town of Grand Bend in Chatham District and in Bertie Twp, Niagara District.	B
Leafminer on oak *Japanagromyza* sp.	red oak	Chatham District	caused severe shot hole damage to trees in the Rondeau and Pinery Park areas	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Leaf blotch *Guignardia aesculi* (Pk.) Stewart	horse-chestnut	Central Region	moderate-to-severe infections on ornamentals at several locations	B
		Chatham and Aylmer districts	Ornamental trees in the towns of Goderich and Parkhill experienced severe foliar damage.	
Leaf dieback of yew *Guignardia philoprina* (Berk. & Curt.) van der Aa	eastern white cedar	St. Williams Nursery	first collection in four years	C
Leaf spot *Mycosphaerella populicola* C.E. Thompe.	balsam poplar	Manitoulin Island, Espanola District; Dryden, Fort Frances and Kenora districts	Moderate-to-severe infections caused early leaf discoloration and defoliation throughout.	B
Septoria populicola Pk.	red oak	Central Region	Light damage occurred throughout the Region.	B
Tubakia dryina (Sacc.) Sutt.		Chatham District	Occasional trees experienced moderate-to-severe damage in a 5-ha area in Harwich Twp and in a 3,000-ha stand in Bosanquet Twp.	B
Linden looper *Erannis tiliaria* (Harr.)	oak	Niagara District	low numbers near the town of Cayuga	B
Maple leafcutter *Paraclemensia acerifoliella* (Fitch)	sugar maple	Eastern Region	a total of 106 ha heavily defoliated in South Crosby and Augusta twps	B
		Central Region	Heavy damage recurred for the fourth consecutive year on 16 ha in Cambridge District and on 5 ha of regeneration on Beausoleil Island, Huronia District.	
		Bancroft District	1 ha of light damage in Anstruther Twp	
Maple trumpet skeletonizer *Epinotia aceriella* (Clem.)	sugar maple	Northeastern Region	moderate damage in Jocelyn and Plummer Add'l twps, Sault Ste. Marie District and in Dawson Twp, Espanola District; heavy south of Lake Nipissing in the North Bay District over an area of 80,709 ha	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Maple trumpet skeletonizer (cont'd) *Epinotia aceriella* (Clem.)		Algonquin Region	heavy in Lount, Machar and Strong twps, Parry Sound District and in Laura Twp, Bracebridge District over an area of 54,341 ha	
		Central Region	light-to-moderate populations common	
		Southwestern Region	Heavy infestations persisted in a 68-ha mature stand in Pearce Provincial Park in Aylmer District and moderate damage occurred through much of the Owen Sound District.	
Maple webworm *Tetralopha asperatella* (Clem.)	sugar maple	Central and Eastern regions	low numbers common	C
Mountain-ash sawfly *Pristiphora geniculata* (Htg.)	mountain-ash	northern Ontario	moderate-to-severe damage on ornamentals and forest trees throughout area	A
		southern Ontario	light-to-moderate damage at scattered locations, particularly in the Southwestern Region	
Needle cast *Davisomycella ampla* (Davis) Darker	jack pine	Northwestern, Northern, Algonquin, Northeastern and North Central regions	Defoliation averaged 50% in five areas in Kirkland Lake and Timmins districts and 36% in eleven areas in Blind River, Wawa, Sault Ste. Marie, Espanola, Sudbury and North Bay districts; elsewhere in six other districts defoliation was less than 20%.	A
Hypoderma sp.	white pine Scots pine	Espanola and Sudbury districts	heavy foliar damage observed on Cockburn Island, Espanola District and in Carlyle and Scollard twps, Sudbury District	B
Lophodermium sp.	pine	province-wide	Moderate-to-severe infections were recorded in North Bay, Espanola, Lindsay, Minden, Bracebridge, Parry Sound and Tweed districts.	A

(cont'd)

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Needletier *Sparganothis sulfureana* Clem.	red pine	Allan Twp, Espanola District	unusually high populations causing damage to 62% of the terminals on 0.5-m trees in a small 0.25-ha plantation	C
Northern pine weevil *Pissodes approximatus* Hopk.	red pine	Brockville and Carleton Place districts	light damage to young stock in two areas totalling 2 ha	C
Northern pitch twig moth *Petrova albicapitana* (Busck.)	jack pine	Hartman Twp, Dryden District	55% of main stems infested on 1.8-m trees in a 1-ha clonal trial area	C
Oak lecanium *Lecanium quercifex* Fitch	red oak	Lavant Twp, Carleton Place District	heavy in about 500 ha of oak stands	C
Oak olethreutid leafroller *Pseudexentera oressoniana* Clem.	oak	Central Region	low levels with a total area of 5 ha at Six Mile Lake Provincial Park, Huronia District and in Onondaga Twp, Cambridge District	C
Oak skeletonizer *Bucculatrix ainsliella* Murt.	oak	Eastern Region	high numbers in about 15 ha in Lavant Twp, Carleton Place District and in approximately 5 ha in Olden Twp, Tweed District	C
		Central Region	heavy damage at numerous points throughout the Niagara District and in the south portion of the Cambridge District; moderate populations in the Maple District; light elsewhere	
Oak webworm *Archips fervidanus* (Clem.)	oak	Southwestern Region	moderate infestation in approximately 25 ha of mature red oak at the St. Williams Forest Station, Aylmer District	C
Orangehumped maplevorm *Symmerista leucitys* Francl.	maple	Eastern Region	trace populations at several locations	C
Orangestriped oakworm *Anisota senatoria* (J.E. Smith)	red oak	Southwestern Region	Populations remain low.	A
Pale spruce gall adelgid *Adelges strobilobius* (Kalt.)	spruce	Cochrane, Kapuskasing and Hearst districts	increased incidence	C
Pales weevil *Hylobius pales* (Hbst.)	Scots pine white spruce	Huronia District	heavy feeding damage to 0.5 ha of Scots pine Christmas trees, Adjala Twp; lighter damage to a few white spruce trees in Tiny Twp	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Pine bark adelgid *Pineus strobi* (Htg.)	white pine	Brockville District, Eastern Region	heavy damage to approximately 2 ha of plantation trees in Edwardsburgh Twp	B
Pine engraver *Ips pini* (Say)	red pine	Pembroke District, Algonquin Region	associated with mortality of sapling-sized trees at three locations	B
		Central Region	associated with drought-stricken trees at two locations in the Huronia District and at one point in the Maple District	
Pine false webworm *Acantholyda erythrocephala* (L.)	pine	Huronia and Lindsay districts, Central Region	medium and heavy infestations in a number of young plantations	A
		remainder of Central Region, Algonquin and Eastern regions	low numbers common	
		Owen Sound District	increased distribution	
		Wingham District	low populations in a 30-ha red pine plantation in Minto Twp; the first record in this district	
Pine gall weevil *Podapion gallicola* Riley	red pine	Lindsay District	Heavy infestations have caused extensive whole-tree, top and branch mortality to red pine plantations in the Northumberland County Forest area.	C
Pine needleminer *Exoteleia pinifoliella* (Chem.)	jack pine	Parry Sound District	Heavy infestations affecting up to 100% of the old foliage occurred in a number of locations in Harrison Twp.	B
Pine needle rust *Coleosporium asterum* (Diet.) Syd.	pine	Hearst, Cochrane, Pembroke, Cornwall, Carleton Place, Napanee and Atikokan districts	Foliar damage was less than 5% in all areas examined except for a 50-ha plantation in Arnott Twp, Hearst District where 40% of the foliage was infected	A
Pine needle scale *Chionaspis pinifoliae* (Fitch)	pine, spruce	Sioux Lookout District	moderate numbers near OMNR air base	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Pine needle scale (cont'd) *Chionaspis pinifoliae* (Fitch)		Sudbury District	high numbers among mature jack pine stands covering an area of approximately 4,070 ha in Cascaden and Cartier twps	
		Parry Sound District	high numbers in Harrison Twp	
Pine needle sheathminer *Zellaria haimbachi* Busck	pine	Northeastern, Algonquin and Central regions	Heavy damage occurred at Windy Lake Provincial Park, Espanola District on semi-mature jack pine, and in the Hiawatha Park area, Tarentorus Twp, Sault Ste. Marie District, also on jack pine. Varying levels of defoliation by this insect have also appeared in the Espanola, Sudbury and Parry Sound districts. Also found with jack pine budworm, Lindsay District.	C
Pine root collar weevil *Hylobius radicis* Buch.	pine	Huronia District	heavy occurrence in a 2-ha Scots pine Christmas tree plantation in Oro Twp, Huronia District	B
Pine spittlebug *Aphrophora cribrata* (Wlk.)	coniferous trees	Wingham and Simcoe districts, Southeastern Region	heavy infestations within a total of approximately 500 ha of white pine, Scots pine and European larch plantations	B
		South Gower Twp, Brockville District, Eastern Region	heavy infestation in a 2-ha white pine plantation	
	coniferous trees	remainder of southern Ontario and Northeastern Region	low and medium populations at a number of locations	
Pine tortoise scale *Toumeyella parvicornis* (Ckll.)	jack pine	Sault Ste. Marie, Blind River and Chapleau districts	low numbers detected through all areas	B
		Temagami, Kirkland Lake and Timmins districts	single or small groups of young trees heavily infested and discolored in reforested areas of all districts	

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Pine webworm *Tetralopha robustella* Zell.	pine	Northwestern Region	light defoliation of semi-mature jack pine; 80% of an 8-ha jack pine stand contained this insect with an average of seven web masses per tree in Forgie Twp, Kenora District; trace populations also found in Melick and Coyle Twp, Kenora District, and Claxton Twp, Fort Frances District	C
Pinkstriped oakworm *Anisota virginiensis virginiensis* (Dru.)	oak	Kenora District, Northwestern Region	moderate defoliation of single trees along McKenzie Portage Road	B
Poplar canker and dieback *Discosporium populeum* (Sacc.) Sutt.	lombardy poplar	Huronia, Owen Sound, Cambridge and Maple districts	infection and disease-related mortality were commonly found in these districts	C
Poplar flea beetle *Altica populi* Brown	balsam poplar	Manitoulin Island	no damage recorded since 1982; indicates population decline	A
Poplar leafmining sawfly *Nusca populifoliella* (Town.)	poplar	Eastern Region	high numbers found among 13 ha of hybrid poplar plantations in South Sherbrooke Twp, Carleton Place District, and in Leeds and Lansdowne Twp, Brockville District	C
Redheaded jack pine sawfly *Neodiprion virginianus* complex	jack pine	Northwestern Region	pockets of severe damage on several 9-m trees at Dogbole Bay, Sioux Lookout	A
Redheaded pine sawfly *Neodiprion lecontei* (Fitch)	red pine	Algonquin Region	populations generally down; moderate infestation in a 1-ha plantation of 5-m red pine in Chandos Twp, Bancroft District and heavy in a 1-ha area on the Algonquin Park boundary in Finlayson Twp, Algonquin Park District	A
		Northeastern, Eastern and Central regions	low numbers of larvae at numerous points	
Redhumped caterpillar *Schizura concinna* (J.E. Smith)	deciduous	Northwestern Region	Moderate-to-severe levels of defoliation on roadside aspen and willow were observed throughout Fort Frances, Kenora and Dryden districts; severe defoliation also occurred along Hwy 72, Sioux Lookout District, and along Hwys 599 and 17, Ignace District.	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Redhumped oakworm *Symmerista canicosta* Francl.	bur oak red oak white oak	Georgian Bay Islands	Populations have declined from severe to light since 1982.	C
	basswood	Chatham and Wingham districts	decline in population levels since 1982; no encounters of this insect in either district this year	
		Eastern Region	small numbers of larvae commonly found	
Red pine cone beetle *Conophthorus resinosae* Hopk.	red pine	Temagami District	Moderate infestations recurred, causing variable damage to approximately 50 ha of red pine plantations and seed orchards.	C
Red pine conevorm *Eucosma monitorana* Heinr.	red pine	Cornwall District, Eastern Region	high numbers in 2-ha Seed Production Area, Cambridge Twp	C
Red pine sawfly *Neodiprion nanulus nanulus* Schedl.	red pine jack pine	Northwestern Region	severe defoliation of jack pine along Hwy 17 in Cathcart, Corman and McNevin twps, Ignace District; moderate damage at several other points in Ignace and Sioux Lookout districts	B
		North Central Region	small pocket of heavy damage near Shebandowan, Thunder Bay District; light-to-moderate damage common at other points in Thunder Bay District west into the Atikokan District	
		Northern Region	high populations in Milner and Tyrell twps, Kirkland Lake District; moderate populations in Garibaldi Twp, Cobalt District	
		Eastern Region	small pocket of medium infestation in approximately 4 ha of planted red pine	
Saddled prominent *Heterocampa guttivitta* (Wlk.)	red oak	Huronia District	decrease in population to trace levels	A

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Saratoga spittlebug *Aphrophora saratogensis* (Fitch)	pine	Algonquin Region	trace mortality of red pine in a 5-ha plantation in Hagarty Twp, Pembroke District, site of a previous infestation	B
Satin moth *Leucoma salicis* (L.)	silver poplar	Eastern Region	heavy defoliation of a few trees in Thurlow Twp, Napanee District; a slight westerly range extension has occurred since 1982	B
Sawyer beetles *Monochamus* spp. mostly *scutellatus* (Say)	jack pine black spruce white spruce eastern white cedar	northern Ontario	Light adult feeding damage was reported in the Nipigon, Timmins, Temagami, Kirkland Lake and Chapleau districts; severe adult feeding damage on mature jack pine occurred near Clear Lake, Caribou Lake and Moose Lake, totalling approximately 31 ha in the Sioux Lookout District. Approximately 4.1 ha of over-mature jack pine were damaged near Schroeml Lake, Red Lake District.	A
Septoria leaf spot *Septoria musiva* Pk.	balsam poplar	Atikokan and Thunder Bay districts	Severe widespread infection caused premature leaf drop.	B
Shoot blight *Sirococcus strobilinus* Preuss	red pine	Atikokan, Blind River, Wawa and Sioux Lookout districts	A low incidence of infection was recorded at all collection points.	A
		Bracebridge District	69% of trees infected in a plantation in Proudfoot Twp	
Venturia macularis (Fr.) Muller & Arx	trembling aspen	province-wide	Damage levels of infected trees varied from 3% in an area in the Espanola District to 100% in one area in the Timmins District.	A
Shorthorned oakworm *Anisota finlaysoni* Riotte	white oak bur oak	Cambridge District	light damage in Blenheim Twp and Milton area	A
Slug sawfly *Caliroa* sp.	red oak	Central Region	moderate damage along fringes of oak stands in Oro Twp, Huronia District; Uxbridge Twp, Maple District; and in the Thorold area, Niagara District	C

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Slug sawfly (cont'd) *Caliroa* sp.		Southwestern Region	damage common on scattered single trees in the Port Burwell area, Aylmer District	
Small birch leafminer *Fotocdemia liriquisti* (Free.)	white birch	Huronia District, Central Region	Heavy damage recurred on 30 ha of lakeshore trees in the Awenda Provincial Park area.	C
Solitary oak leafminer *Cameraria hamadryadella* (Clem.)	bur oak red oak white oak	southern Ontario	heavy defoliation reported from scattered areas in the Southwestern Region; low defoliation through the Pembroke District	B
		Eastern Region	heavy defoliation over 0.2 ha in Fitzroy Twp, Carleton Place District and moderate over 0.5 ha in Front of Yonge Twp, Brockville District	
Southern pine engraver *Ips grandicollis* (Eich.)	red pine	Fort Frances District, Northwestern Region	three pockets totalling about 1 ha of drought-affected trees infested at Rocky Inlet, Rainy Lake	C
Spearmarked black moth *Rheumaptera hastata* (L.)	white birch yellow birch alder pin cherry	Chapleau and Cochrane districts	population levels dropped considerably; light defoliation within an area of 113,922 ha, compared to 410,000 ha of moderate-to-severe defoliation in 1982	B
Spiny ash sawfly *Eupareophora parca* (Cress.)	ash	Timmins, Kirkland Lake, Temagami districts	light defoliation of most black ash	C
Spring cankerworm *Paleacrita vernata* (Peck)	deciduous	Simcoe District, St. Williams-Port Rowan	heavy infestations with up to 100% defoliation of roadside locust trees	C
Spruce coneworm *Dioryctria reniculelloides* Mut. & Mun.	spruce balsam fir	northern Ontario	Low-to-moderate populations were found feeding in conjunction with *Choristoneura fumiferana* at Geraldton, Terrace Bay, Cochrane, Hearst and Sioux Lookout districts.	C
Spruce gall adelgid *Adelges lariciatus* (Patch)	white spruce European larch	northern Ontario	declining low populations except in Kapuskasing, Cochrane and Hearst districts; 72% of trees affected in a 50-ha plantation in Reaume Twp, Cochrane District	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Spruce needle rusts *Chrysomyxa ledi* (Alb. & Schw.) d.By	white spruce black spruce	northern Ontario	found commonly at high infection levels (often 100%) but actual foliar damage was usually less than 10% except for several areas in Sioux Lookout and Red Lake districts where infection levels of 100% and foliar damage in the 90% to 100% range was recorded	B
Striped alder sawfly *Hemichroa crocea* (Geoff.)	alder white birch	Northwestern and Northern regions	moderate-to-severe defoliation of single trees in Kenora, Fort Frances and Kapuskasing districts	C
Striped sumac leafroller *Hephopteryx subfuscella* Rag.	sumac	Huronia District, Central Region and Owen Sound District, Southwestern Region	Unusually high populations caused moderate and severe damage to small clumps of trees at numerous locations.	C
Sweetfern blister rust *Cronartium comptoniae* Arth.	jack pine	Northern Region	A low incidence was reported in all areas examined except in Calvert Twp, Cochrane District where a 20% incidence of infection was recorded.	A
Tar spot *Rhytisma acerinum* (Pers. ex St. Amans) Fr.	red maple	Owen Sound District	severe damage observed on understory and fringe trees in MacGregor Point Provincial Park	C
Twig blight *Cenangium ferruginosum* (Fr.) Fr.	red pine white pine	Cornwall and Brockville districts	a low incidence in about 8 ha of planted trees	B
Twoleaf tier *Peilocrocis reflexella* Clem.	red oak	Huronia District, Central Region	Feeding in association with other insects caused conspicuous leaf browning at several locations.	C
Variable oakleaf caterpillar *Heterocampa manteo* (Dbldy.)	basswood	Fort Frances District, Northwestern Region	trace roadside defoliation along Hwy 600	C
Walnut caterpillar *Datana integerrima* G. & R.	black walnut bitternut hickory shagbark hickory butternut	Southwestern and Central regions	low levels of infestation with occasional colonies at several locations; defoliation less than 10% in both regions	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Walnut shoot moth *Acrobasis demotella* Grt.	black walnut	Aylmer District, Southwestern Region	moderate shoot damage at Pearce Provincial Park and Shedden	A
Western gall rust *Endocronartium harknessii* (J.P. Moore) Y. Hirat.	jack pine Scots pine	province-wide	found throughout the range of the hosts with levels of infection varying from .7% in an area in Wawa District to 27% in an area in Chapleau District	A
White pine blister rust *Cronartium ribicola* J.C. Fisch.	white pine	province-wide	little change in status over previous years; one mature stand in Killarney Twp, Sudbury District had 10.7% of the trees infected	A
White pine weevil *Pissodes strobi* (Peck)	eastern white pine jack pine red pine white spruce mugho pine black spruce Norway spruce	province-wide	Populations again remained low in northern Ontario except for areas in the Northeastern Region, where 20-60% of leaders were damaged on white pine and as many as 21% were damaged on jack pine. Southern Ontario had lower numbers of damaged leaders than in 1982, with the highest incidence occurring in Huronia District, on white pine, with 46% of leaders attacked.	A
Willow flea weevil *Rhynchaenus rufipes* (Lec.)	willow	Brockville District, Eastern Region	heavy over 0.5 ha in Elizabethtown Twp	C
Willow leafblotch miner *Phyllonoryoter kenora* (Free.)	willow	Northern Region	high populations on roadside trees in western part of Hearst District	C
		Northwestern Region	high populations on roadside trees throughout Sioux Lookout, Red Lake and Ignace districts	
Willow leafminer *Micrurapteryx salicifoliella* Chan.	willow	northern Ontario	severe browning of foliage along roadsides in the Hearst, Geraldton, Nipigon (east), Terrace Bay and Wawa (west) districts	B

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OTHER NOTEWORTHY INSECTS AND DISEASES (concl.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Willow shoot sawfly *Janus abbreviatus* (Say)	willow poplar	Lindsay District	considerable shoot mortality in one compartment of hybrid poplar, Orono Forest Station	C
Woolly alder aphid *Paraprociphilus tessellatus* (Fitch)	sugar maple silver maple alder	northern Ontario	decline in incidence; no infestations reported	B
Yellow birch leaffolder *Anchylopera discigerana* Wlk.	yellow birch	Sault Ste. Marie District	moderate damage near Tilley Lakes and light near Turkey Lake, Wishart Twp	C
Yellowheaded spruce sawfly *Pikonema alaskensis* (Roh.)	white spruce black spruce	northern Ontario	moderate-to-severe defoliation in small, scattered pockets throughout the Northern Region; commonly found along roadsides and windbreaks	A
		southern Ontario	light-to-moderate defoliation; population levels appear to be rising in localized areas in Bancroft and Napanee districts, in comparison with endemic levels during 1982	
Yellownecked caterpillar *Datana ministra* (Dru.)	white birch basswood	Temagami, Kirkland Lake, Fort Frances, Kenora, Dryden,	light defoliation of single trees and small clumps of trees	A
Zimmerman pine moth *Dioryotria zimmermani* (Grt.)	pine	Central Region	negative incidence; decline in population	C

ABIOTIC DAMAGE

Agent	Host(s)	Locality	Remarks
Frost	spruce balsam fir basswood red oak white ash	Bancroft, Maple, Huronia, Sudbury, North Bay, Tweed, Carleton Place and Minden districts	Varying levels of damage to the shoots of balsam fir were observed.
		Brockville, Napanee, Huronia, Owen Sound, Cambridge, Maple, Minden, Bracebridge and Lindsay districts	Early frosts caused premature leaf defoliation of some deciduous species; however, affected trees regained foliage.
		Algonquin, Pembroke and Hearst districts	Damage to spruce varied from 2% to 10% in three areas of regeneration examined.
Hail	jack pine	Hemaskwash Twp, Wawa District	Moderate foliar damage of 14% was observed in a 50-ha stand near Pakei Lake.
Snow	trembling aspen jack pine	Sudbury District	Wet, heavy snowfall caused limb and stem breakage on fringe trees.
Single-tree mortality	balsam fir	Cochrane, Hearst and Kapuskasing districts	Extended periods of hot, dry weather may have precipitated an increase in incidence.
Winter drying	white pine spruce	Parry Sound, Bracebridge and Huronia districts	A mild winter followed by a cold spell in the spring resulted in discoloraton and partial defoliation of old foliage of spruce.
		Blind River District	light damage apparent in a 5-ha plantation in Patton Twp
Wind damage	poplar	Fort Frances District	Single-tree damage was encountered throughout the area.
	deciduous and coniferous trees	Cambridge District	Severe winds in early May caused considerable blowdown from Plattsville to Cambridge.
	black spruce poplar white birch	Cochrane, Hearst and Kapuskasing districts	Numerous small pockets of blowdown caused by a severe windstorm were observed in Kineras and Harewood twps, Cochrane District and and an accompanying single-tree blowdown was observed throughout the Cochrane, Hearst and Kapuskasing districts.
	deciduous and coniferous trees	Atikokan District	A total of 650 ha of downed timber was observed at three locations.
Discoloration of white cedar	eastern white cedar	Manitoulin Island, Espanola District	Severe discoloration of foliage caused by an unidentified agent affected 4,540 ha.
Salt		province-wide	A mild winter and corresponding reduction in the use of road salt accounted for a decrease in damaged trees.